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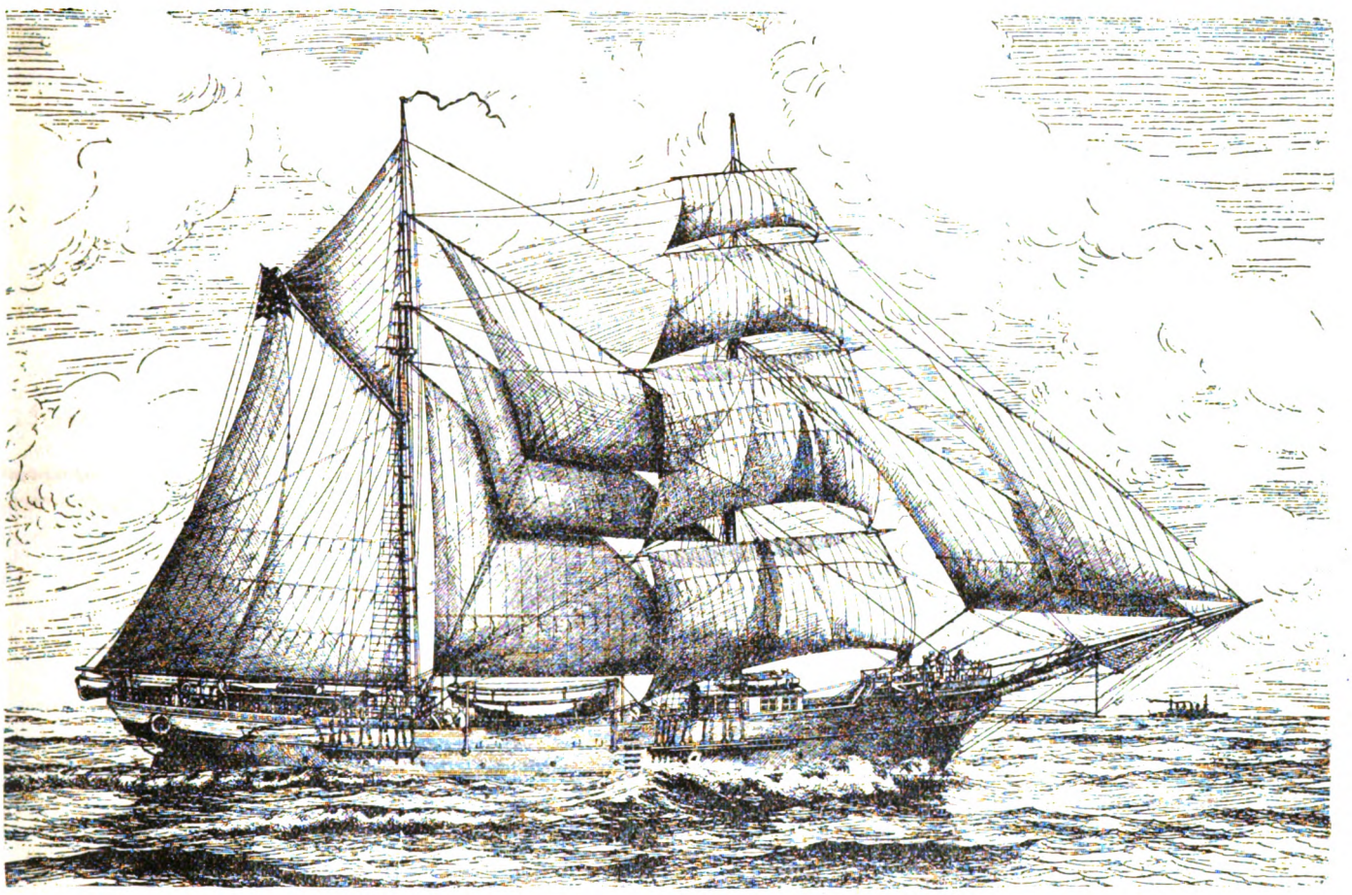
No. 13

TRAINING SHIPS FOR THE NAVY.

In order that the young men who join the United States navy may know something of seamanship as it was known in the days of sail, the United States navy department is building, as already chronicled in the Review, two training ships. One of these, known as the Boxer, is now being built at the Portsmouth navy yard; the other is not yet laid down. The training ships will be 126 ft. over all, 108 ft. keel, 30 ft. beam and 10 ft. deep. Their displacement will be about 350 tons. They will be equipped with everything that will be needed to teach the art of sailing to the youngsters. The vessels will be constructed of yellow pine and white oak, coppered below the water line. They will have a poop and forecastle deck and bulkhead amidships. Accommodations will be provided for the commanding officer and two other officers in the deckhouse built on the poop deck, this house being provided with three staterooms with the usual fittings. The crew will have quarters below the main deck. A deckhouse forward on the main deck will hold the galleys where all the cooking will be done. On the forecastle deck a hand capstan will be placed for casting the anchors and warping ship and below this deck will be fitted a pump-brake windlass. A hand steering gear on the poop deck will be provided for handling the craft. The outfit of sails will be especially complete.



Training Ship for the United States Navy building at Portsmouth Navy Yard.

VICTORY FOR SUBMARINES.

A Newport dispatch says that in view of the defeat administered to the torpedo boats by the submarine boats Adder and Moccasin last week the commander at the torpedo station arranged for another attack at sea in the hope that a torpedo boat would come off victorious over a submarine fighter. The first attacks were under most favorable circumstances with a smooth sea, but on Saturday last there was quite a chop on and it was thought that a submarine boat would be unable to get within striking distance without being picked up.

About noon the torpedo boat Craven, in command of Lieut. Marble, was sent out to the Brenton's reef lightship with instructions to look out for an attack, and, if possible, to destroy the submarine. An hour later the Adder, in command of Lieut. Pinney, left the torpedo station. As soon as the Adder had reached the outer harbor she was submerged, and in that condition made a run of forty-five minutes, during which the crew went to dinner. Upon arriving near the lightship the Adder came to the surface for observations, and seeing the Craven, at once dived and made for her, coming to the surface and firing a dummy torpedo. Had it been real war the torpedo boat would have been sunk. The crew of the Craven were at the rapid fire guns and torpedo tubes, ready for action, should they find the Adder, but before they could do anything the Adder had fired the torpedo and the Craven was supposed to be out of action.

The crew of the Adder are very much elated over their victories over the torpedo boats, as there has been a feeling that the submarines were of little use. These have really been the first good tests the boats have had. Later a series of similar drills will be arranged for them. The destroyers are to hold torpedo practice in Narragansett bay before leaving for the winter's cruise in southern waters.

The proposed Mediterranean service of the Cunard Line will be inaugurated on Oct. 28 when the Aurania will sail from New York for Gibraltar, Genoa, Naples, Palermo, Venice, Trieste and Flume. She will be followed on Nov. 25 by the Carpathia, and these two boats will alternate thereafter in a three weeks' service throughout the winter. When the Cunard company withdrew from the transatlantic agreement it was freely predicted that it was only the preparatory step toward making a strong bid for a larger share of the south of Europe immigrant traffic, hitherto practically controlled by the German and Italian lines. These predictions are now verified. Maritime interests are awaiting the outcome of the entry into the field of the new competitor. Whether it will result in a war of rates or in cheapening the cost of the passage remains to be seen. Neither the Aurania nor the Carpathia has accommodations for first-class passengers, and the new service will cater only to second-class and steerage traffic. Each of the boats can carry about 1,600 in the steerage. This is about the capacity of the average Mediterranean boat.

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PHILADELPHIA SHIP BUILDING NOTES.

Philadelphia, Sept. 24.—The hurricane along the Atlantic coast Sept. 16, created repair work enough to keep the local ship yards busy for some time. In addition to battering up a large number of vessels the hurricane sent a number to the bottom and each day news of some new disaster is received. The loss of the Mexicana, a steel steamer, under charter to the Standard Oil Co., occurred off the Florida coast. The vessel left Marcus Hook Sept. 14 with a cargo of 775,665 gallons of crude petroleum, valued at $46,242.51. Capt. R. S. King and all the crew of 24, save two, were lost. The Mexicana was built at Sunderland in 1893; was 270 ft.long, 35 ft. beam and 22½ ft. deep; 1,973 tons register. She was managed by Phillips, Phillips & Co. of Middlesex, England.

Reports received by interested New Jersey parties are to the effect that the battleship New Jersey, building at the Fore River Ship & Engine Building Co.'s yard, will be ready for launching early next spring. The builders regard the present state of progress of work upon the vessel as sufficient to warrant such an assurance. The New Jersey is a sister ship to the Rhode Island, the contracts for both ships being awarded Feb. 15, 1901. The two ships are in the 435 ft. class—47 ft. in excess of any other battleship in the navy. They have an extreme breadth on the water line of 76 ft. 2½ in.—just 4 ft. greater than any of the others. A broadside discharge of the New Jersey will throw 5,600 lb. of steel projectiles, such is to be her heavy armament. The launching of the vessel will be attended by a large host of Jersey officials and citizens.

Advices were received at the offices of the New York Ship Building Co., Camden, last Monday that the steamer Texan, built by the company for the American-Hawaiian Steamship Co., left Tacoma, Washington, that day en route for the Delaware breakwater. The vessel intends to steam the entire distance, 13,900 miles, without a stop and her captain, Morrison, is confident he will make the trip in about 50 days. The Texan is a steel vessel with twin propellers and registers 8,633 gross tons. It will prove to be a remarkable voyage. The Manchuria, being constructed at the yards for the Pacific Mail Steamship Co. will be launched Oct. 15 according to present expectations. Ceremonies attending the laying of the keel of the cruiser Washington may occur on the same day.

Rear Admiral Sigsbee asserted last week that in less than six years the League Island navy yard will be the greatest naval station on the Atlantic coast. The improvements being made are lasting ones. Sub-bids are being asked by Contractor John W. Emery for an addition to the steel plate bending house at the League Island navy yard. Plans have also been posted for a residence for officers at the yard. It will be two stories high, with a shingle and plaster front, to measure 41.6 by 59.9½ ft. On the first floor will be a large hall, library, dining room, drawing room, pantry and kitchen. Four bed rooms and two baths will be on the second floor.

The Governor Pennypacker, a steel quarantine steam cutter, built for the state of Pennsylvania by the Neafie & Levy Ship & Engine Building Co., was launched at the company's yards Sept. 17. Miss Anna M. W. Pennypacker, daughter of Pennsylvania's governor, was sponsor. Governor Pennypacker, Com'dr Cowles and Rear Admiral Sigsbee were among those who witnessed the launch which was successful in every way. The cutter, which is about the size of a large tug, cost $25,000 and when completed will be stationed at the state quarantine station, Marcus Hook.

At the Harlan & Hollingsworth yard, Wilmington, work on the steel car float for the New York, Pennsylvania & Norfolk railroad is nearing completion. The float will have an enormous carrying capacity. Work on the steel ferryboat Erie, being constructed for the Erie railroad, is progressing rapidly and is one of the finest ferryboats ever at the yard. The painters take her in hand this week

The Delaware River Steel Co. has commenced operations at Chester for the erection of a large steel plant. Major E. H. Goodman, formerly vice president of the Pullman Palace Car Co., is president of the company and Edward J. Altemus, formerly connected with the Neafie & Levy Ship & Engine Building Co., is secretary. The company, recently organized, is capitalized at $500,000.

The battleship Maine is at League island, where she makes a stop of one week to take on a partial equipment of ammunition and provisions. About 600 tons of dynamite, torpedoes, mines and shells are to be put aboard. The Maine is commanded by Captain Leutze. The Maine leaves next Friday for her trial tests in gunnery and speed, to be made in southern waters.

The steamship Decatur H. Miller, of the Miners' & Merchants' Transportation Co., is to be lengthened 25 ft. amidships and otherwise improved. The Miller was built at the Harlan & Hollingsworth Co.'s yard and is 257 ft. long, 38 ft. beam and 16 ft. deep. The Maryland Steel Co. has the contract to lengthen her.

Fire damaged the steam barge Lorena Foster, at Wilson Rickenbach's ship yard, East Camden, to the extent of $4,000 last week. The barge, owned by George and John Foster, of Camden, was being repaired at the yards named.

The steamship San Jacinto, recently launched at the Roach yard, Chester, is so far advanced toward completion that it is thought she will be ready for her trial trip the latter part of November.

The auxiliary yacht Fortuna was launched at Joseph H. Stewart's yards, New Castle, last week. She has a speed of 11 knots an hour and was built for Col. Fredericks of Virginia.

Boatbuilder John H. Leppee of Woodbury, N. J., launched the first boat built at his yard last Saturday. It was a naphtha launch built for former Water Superintendent Brown.

The Niles-Bement-Pond Co. has received orders from the Mexican Central railway shops for two 60-ton cranes and some large machinery, to be sent to Aguaacalientes.

The barge Bear Ridge was badly damaged by fire last Friday, near the Delaware breakwater. The engine room and forward deck were destroyed.

LATEST LINER OF MORGAN COMBINE.

The Republic, the latest of the vessels of the International Mercantile Marine Co., is to sail for this country on Oct. 1. She was built for the Dominion Line and named Columbus but upon the taking over last week of the Liverpool service of the Dominion Line by the White Star Line she was re-named Republic. The Republic is a twin-screw steamer of the latest and most approved type. She is designed to maintain a high rate of speed at sea and it is expected will be one of the fastest liners engaged in the Liverpool-Boston service.

The Republic is of similar design to the favorite Commonwealth (now the Canopic), but of larger dimensions, having a gross tonnage of considerably over 15,000 tons. She is nearly 600 ft. in length, and has a beam of 68 ft. The lines of the ship are fine, and her general appearance commanding. She is fitted with four pole masts, and one funnel of proportionate dimensions. The hull is exceptionally strong, and is of the cellular double-bottom type, a large quantity of water ballast being allowed for in the bottom and deep tanks, so that she will be eminently suitable for use in the transport service. All the latest appliances for working the ship and handling the cargo are provided throughout; whilst for the dead meat trade the ship has extensive accommodation in the insulated holds. The propelling machinery consists of two sets of quadruple-expansion engines of the latest design. Other machinery consists of refrigerating, electric lighting, and extensive pumping installations, as well as the various auxiliaries to be found in the engine-rooms of modern steamers. As before intimated, the Republic is in many ways similar to the Canopic, and for most purposes a description of that ship's passenger accommodation somewhat amplified would serve for the new vessel. The main dining saloon is contained in a steel house erected on the awning deck. It is beautifully wainscoted and decorated, and handsomely furnished. It is surmounted with an elaborate stained dome skylight. Seating is provided for no fewer than 200 passengers. The saloon is approached by a handsome and spacious stairway leading down from a companionway above, and from each side of the awning deck. On the deck above is the house containing the companionway entrance, together with a ladies' room and library. These are richly and tastefully decorated and furnished, polished hardwoods being used in the finishing of the various apartments. The upholstery is of tapestry, and in harmony with the surroundings. The ladies' room and lounge is immediately forward of the library, and is richly appointed. Stained glass windows are fitted into the saloon dome, and on deck. The majority of the staterooms are in the same house as the main saloon, all the baths, lavatories, etc., being at the after end of the same erection. Second-class passengers are accommodated on the deck below, and are excellently provided for, the fine dining-room being fitted to seat over 100 passengers. The apartment is splendidly arranged, furnished, and decorated. On this deck there are also a large number of first and second-class staterooms. Other offices and apartments are likewise fitted on the same deck, including galleys, pantries, etc. On the middle deck more first-class staterooms are provided forward, whilst a number of second-class rooms are situated aft. These are arranged conveniently for the respective saloons and accommodation. A comfortable smokeroom for second-class passengers, also a ladies' room, are arranged on the awning deck above the second saloon. The third-class passengers are splendidly catered for, there being a well fitted up mess-room for them on the upper deck aft, and a smoking room on the awning deck. Enclosed berths for this class of passengers are provided throughout on the upper deck. The captain's room and chart room are situated on the boat deck, with pilot house above. The officers' berths are also on the same deck, forward of the boiler casing. The crew's accommodation is well arranged, and their quarters commodious and comfortable. Throughout every attention has been given to detail, and this ship is yet another to the credit of her Belfast builders—Messrs. Harland & Wolff. The Republic is booked to sail from Liverpool on her maiden voyage on Oct. 1.

In order to determine how well the five torpedo boat destroyers recently ordered to the Asiatic naval station will be able to withstand tempestuous weather on their long and hazardous voyage, the navy department has arranged to have a test made of the seagoing qualities of these little vessels during the first heavy weather off the Virginia capes. Capt. Train, the president of the board of inspection and survey, has been directed to conduct the tests. The cruiser Chicago, now at New York, has been ordered to Norfolk to accompany the destroyers during the test. The flotilla is composed of the Decatur, Lieut. L. M. Chandler; the Bainbridge, Lieut. G. W. Williams; the Barry, Lieut. N. E. Irwin; the Chauncey, Lieut. S. E Moses, and the Dale, Lieut H. I. Cone.

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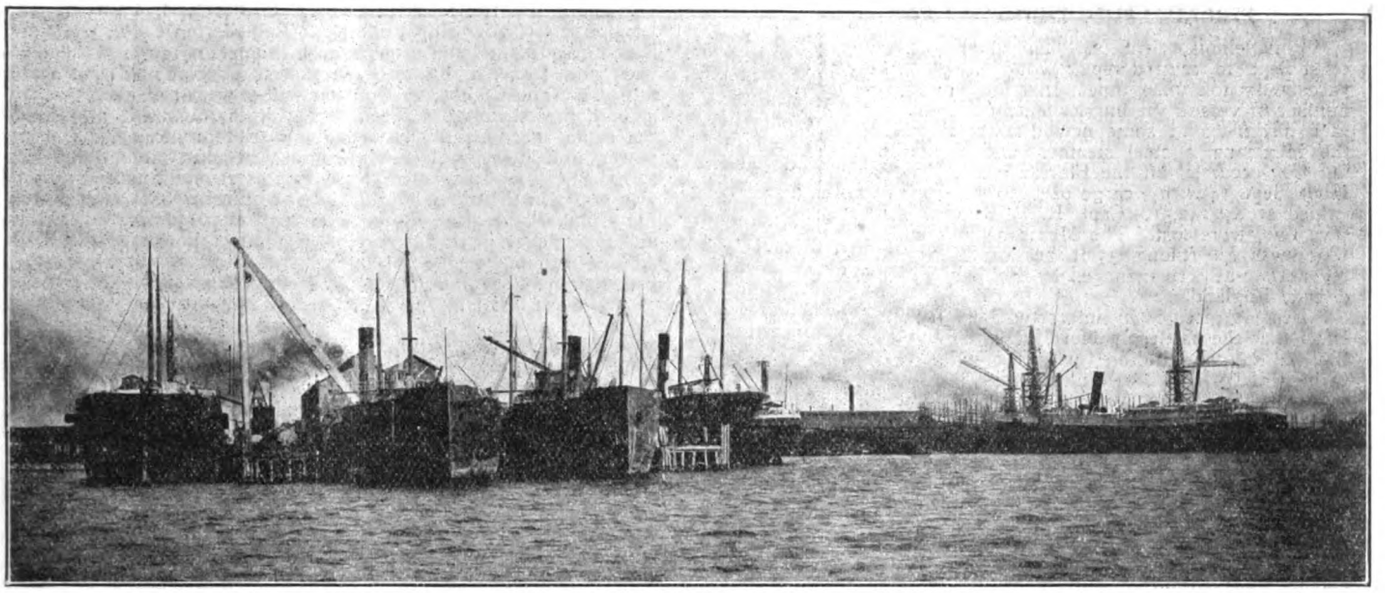

Off Shore View of Fitting Out Wharves at Maryland Steel Co.'s Ship Yard, Sparrow's Point, Md.

TRADE WITH HONG KONG.

The great developments which are taking place in the far east are adding to the importance of Hong Kong, not only from a commercial and industrial point but also from a political point of view. Unfortunately during the past year an outbreak of plague caused a great expenditure over the estimates. Formerly Hong Kong was very unhealthy owing to the bad sanitary conditions but latterly these conditions have been much improved. The plague which for some time past has been giving the authorities a great deal of trouble has been confined to the Chinese. The value of the exports in the year 1902, in vessels of European construction, amounted to $3,963,463, and of the goods in transit $2,372,397, being a grand total of $6,335,860, showing an increase of $720,288 over the previous year.

The following table indicates the nationality of the various ships entering the port, the numbers of vessels under each flag and the tonnage carried by them, compared with the similar figures for the previous year:

Flag.	Ships.		No of times entered.		Total tonnage.	
	1901.	1902.	1901.	1902.	1901.	1902.
British	321	324	1770	1753	2,894.519	2,965.030
Austrian	20	20	53	50	128,483	125 929
Belgian	3	1	9	3	12,407	3,624
Chinese	4	17	10	135	3,349	163,396
Corean	1	....	1	....	796	....
Danish	8	6	12	13	25.903	23,374
Dutch	9	8	29	23	40,872	26,464
French	22	27	206	228	209,094	219 111
German	122	123	842	939	1,242.499	1 360 524
Italian	2	4	12	14	17.988	23.428
Japanese	65	56	336	404	692.981	865,400
Norwegian	26	49	79	300	78.004	263,379
Portuguese	3	3	49	46	4 948	7.897
Russian	4	11	4	16	8 797	32,046
Spanish	1	..	1	.....	784	.....
Swedish	1	4	7	15	6.923	14,325
United States	19	23	89	56	130,476	121,939
No flag	1	.....	1	.....	80	.. ....
Total	632	676	3510	4000	5,498,903	6,215,866

The above return refers to steamers only. In addition, forty-two sailing vessels visited the port during the year, with a total tonnage of 68,392, as compared with fifty ships and 56,429 tons during 1901; twenty-six of these ships were British and nine American.

Although Hong Kong is never likely to become a great industrial center, still the recent additions which have been made to the territories of the colony open up considerable possibilities for special industries. The mere fact that it is under the British government will, in itself, be sufficient to attract capital looking for investment. The most of the local industries were carried on during the year 1902 with satisfactory results, although the plague hampered them considerably. The fall in the price of silver, however embarrassing in other respects, is undoubtedly advantageous as regards many local productions and industries. Cotton spinning was carried on during the year under more favorable circumstances than have prevailed since the initiation of this industry. The improved skill on the part of operatives resulted in largely increased production, and, aided by declining exchange, which checked excessive imports of Indian yarns, the local spinnings were freely sold at gradually advancing dollar prices. Under normal conditions the progress of this industry may now be considered as assured, but the possibility of an annual recurrence of plague, which drives many of the workpeople from the colony, owing to their strong dislike to the measures instituted by the sanitary authorities, is a factor which must not be overlooked in attempting a forecast. The sugar industry had many adverse conditions to contend against during the year, which was a most unprofitable one. Chief amongst these was the continued competition with bounty-fed beet sugars, which low prices in Europe (the result of enormous over-production) allowed of being placed in eastern markets at a level never before reached. The preferential treatment accorded to refineries in Japan, and the very onerous conditions there to be contended against, constitute a very severe handicap to trade with that country, which was formerly an important outlet for the production in Hong Kong. Scarcity of water and greatly increased cost of labor were factors which further conduced to an unfavorable result to local refineries. In other respects the outlook for industrial enterprise in Hong Kong is, on the whole, promising.

'Fishing occupies a considerable proportion of the boat population of Kong Kong, but the fishing industry has not assumed any great dimensions in the immediate neighborhood of the colony, or within its territorial waters. Attention is being paid to forestry, botanical science, and agriculture, so that the most may be made of the land in the colony, some parts of which, however, are being sold to private proprietors, and no doubt fortunes are being made and lost in land speculation. The educational system of the colony is at present undergoing revision, and it is expected that the improvements which are being made will have good results. Various public works were undertaken or completed within the year, such as the new law courts, the road to Taipo, the western market, the new harbor office, an extension of the British Tytam reservoir, the Kowloon water works, and the governor's new peak residence. The new territory has continued its gradual and peaceful development; and if it were not for the occasional inroads of disorderly characters from the Chinese side of the frontier, there would be little to record in the way of robbery or outrage. In concluding his report the governor says: "In spite of the depression caused, especially in import trade, by the fluctuations in the silver market and other more remote causes, the prosperity of the colony has continued to expand during the past year. Statistics show that, in spite of the heavy drain upon the resources of the colony caused directly and indirectly by the annual recurrence of plague, the financial position of the colony is sound and gives no cause for uneasiness for the future. At the same time it is well to remember that the assets of this colony are practically the goodwill of its commerce, and it is only by a continuance of its seaborne trade—which fortunately as yet shows no signs of declining—that the colony can expect to remain in its present prosperous condition."

The Petit Parisien states that the experiments of firing from the fore turret of the French cruiser Sully are to be repeated at Brest. In addition to six sheep, a number of birds of different kinds will be in the turret at the time of firing. The majority of French artillery officers are of opinion that these experiments with animals are useless, as men are able to bear, without injury, that which would seriously affect a sheep; while, on the other hand, men have been knocked down and bruised by the recoil of the guns and the consequent displacement of the turret on its axis, when such disturbances would not overturn a four-footed animal. The French minister of marine is expected to be present at the new experiments.

The armored cruiser Maryland which did not entirely leave the ways at Newport News when launched was successfully floated without damage last week. The battleship was, indeed, as safe at all times as though she were in a cradle.

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SCOTCH SHIPPING LETTER.

Glasgow, Sept. 11.—While, as has already been reported in these letters, the ship building industry is at present depressed, and orders are not coming in within measurable distance of the tonnage leaving builders' stocks, it is not improbable that there may be some revival before winter—at all events in this district. It is known that some of the large owners of cargo fleets who sold out when there was such a rush of demand from foreigners for second-hand vessels, have not yet replaced their fleets. They have been watching markets and biding their time. Now while there has been no improvement in the freight markets, and there is at present no prospect of any, there is a prospect of large movement of crops next year both on the Atlantic and on the Pacific. And the natural wastage of shipping is continuously in process. The calculation now is whether by the time any vessels ordered this year may be ready for action there will not be a general improvement in shipping conditions. The ship owner, like every other business man who wants to succeed, must look ahead and provide for the future. And that, I have good reason for believing, our large tramp owners are preparing to do. The point they have at present to consider is whether costs are or are not likely to come lower to any material extent.

As far as one can judge the prospects at present, the cost of ship building is not likely to be lower in the near future. The price of steel ship plates here is £5.17.6 per ton less 5 per cent., and in the north of England it is £5.12.6 less 2½ per cent. These are high rates compared with figures current in the times of depression which preceded the great boom in ship building, but they are, after all, not dear. Such as they are, manufacturers declare that they barely, if at all, cover costs, and that they cannot possibly be reduced on present basis for pig iron, fuel and labor. As to labor, there is too much employment overhead, notwithstanding the reputed dullness of trade, for a successful effort to reduce wages to any extent. As to fuel, the winter season is at hand when coal is most in demand and already the output is moving away readily, so there is not much hope in that direction. And as to pig iron, the prospect is rather of higher than of lower prices. The warrant stocks are exceedingly small and are practically held by one or two wealthy firms who certainly will not give them away. Although the American demand for British pig iron has disappeared the overhead demand remains so great that neither in Scotland nor in Cleveland have smelters any reserves. Indeed they have difficulty in meeting the requirements of home consumers and exporters. Scotch smelters last week advanced their prices for their brands 1s. per ton, and are obtaining their advances quite freely.

CONSIDERING DESIGNS FOR TURBINES.

The Cunard Steamship Co. is considering designs for steam turbines in the two 25-knot steamers it is about to build, and perhaps this means the ultimate adoption of the new steam motor system, but of course this is as yet undecided. A difficulty has occurred in connection with the dimensions of the shafting required for reciprocating engines of the power necessary to ensure the speed of 25 knots. With the turbine this difficulty would not exist, for in this system a light shaft only is required. The weight of the turbine machinery also would be much less. With reciprocating engines the weight of machinery for the high power will exceed 10,000 tons, and if one-third or so could be saved the size, displacement, and the cost of the ships could be reduced without affecting their accommodation. The turbine could be designed to work most economically at its full power, and steam turbines of 10,000 I. H. P. are now being built on the continent under a guarantee that the steam consumption will not exceed 8.8 lb. per indicated horse power per hour. Steam turbines of 5,000 I. H. P. have given even more economical results, while 13 to 14 lb. of steam per horse power is considered a good result for ordinary reciprocating engines of the quadruple expansion type. A steam economy of 20 per cent. would be a good reduction. The reduction in weight of turbines as compared with ordinary engines, the smaller steam consumption affecting materially the displacement and power necessary for a given speed, would reduce the steam generating plant and its weight, resulting in a further lessening of size and cost, with a large reduction in coal consumption. Even with the addition of large independent turbines to drive the ship astern, there should be material gain in size and cost. The decision of the Cunard company in this matter is awaited with great interest.

The Russian naval authorities recently fitted up an experimental ship for the education of engineers and stokers, and also for research work on behalf of the navy. This Russian vessel, in addition to having six Belleville, six Niclausse, six Yarrow, and two Schultz-Thorneycroft boilers, has three different kinds of feed pumps with other auxiliaries in duplicate. It is possible to have either open or closed stokeholds and to test single and compound engines for fans. There are on board between 150 and 160 steam cylinders. One trial at full power showed that the use of feed-heaters resulted in a saving of coal of nearly 5 per cent., the fuel consumption with the feed-heaters working being 1.60 lb. and without 1.67 lb., other conditions being equal. It is shown that the large-tube boilers consume less coal per unit of power than the small-tube boilers, according to the experience in the British navy. These are only a few of the results already ascertained by the Russian naval authorities, and they show that, apart from the advantage of training the stokers, there is great advantage in testing inventors' theories before more carefully testing their practice.

The steam trials of the cruiser Cumberland, built by the London & Glasgow Ship Building & Engineering Co. at Glasgow, have exceeded in some respects even the performance of the Berwick and Donegal, hitherto the fastest of Clyde-built armored cruisers. The Cumberland on her full-power trial averaged for eight hours' steaming a speed of 23.7 knots, which is practically the same speed as the Donegal and the Berwick. The mean power indicated by the twin engines in the Cumberland was 22,769 H. P., and the average number of revolutions per minute was 145. On the thirty-hours' trial at continuous steaming power, the Cumberland attained the speed of 22.5 knots, the engines making an average of 133 revolutions, and indicating 16,400 H. P. At one-fifth power the speed was 15.8 knots, with the engines making ninety revolutions, and indicating 4,674 H. P. The vessel of this class last tried made only 22.30 and 14.75 knots at these respective powers. The coal consumption of the Cumberland on all three trials was within 2 lb. per indicated horse power per hour.

An interesting vessel for your side of the Atlantic has just been launched here by Napier & Miller, Ltd., viz: the steel screw steamer Pontiac, built to the order of J. W. Carmichael & Co., Ltd., of New Glasgow, Nova Scotia. The principal dimensions of the vessel are: Length between perpendiculars 352 ft.; breadth 48 ft. 3 in.; depth molded 25 ft.; with a gross tonnage of about 3,270 tons, and a dead weight of about 5,500 tons. The vessel has been built to Lloyd's 100 A1 classification, under the three-deck rule, with complete shelter deck all fore and aft. Water ballast has been provided for in cellular double bottom, also fore and aft peaks, and deep ballast tank abaft the engine room, in all about 1,800 tons. The accommodation for captain, officers, and engineers is provided for in houses placed on shelter deck, while the crew are berthed aft and cattlemen forward under shelter deck. The 'tween decks are high, and specially arranged for carrying either cattle or cotton. The vessel has large hatches and nine steam winches and derricks, for the rapid handling of cargo, also steam windlass and steam steering gear. A complete installation of electric light has been fitted throughout, also a system of steam fire extinguishing pipes to all holds and 'tween decks. The machinery consists of triple-expansion engines, with cylinders 25½ in., 42 in., and 68 in., and a 45-in. stroke, having two boilers of large size and donkey boiler, also a bronze propeller.

WHITE STAR TO OPERATE DOMINION BOATS.

Announcement is made of the transfer of two branches of the Dominion Line to the White Star Line. These branches are the service between Boston and the Mediterranean and that between Boston and Liverpool. This does not mean the absorption of the Dominion Line by the White Star company for the former will continue to operate its service between Liverpool and Montreal and Liverpool and Portland. The White Star Line will take over a number of steamships which, after being overhauled, and renamed according to the White Star system of names ending in "ic" will be used in the new service. The following is a list of the vessels to be taken over:

MEDITERRANEAN SERVICE.

Old name.	Tonnage.	New name.
Columbus	15,000	Republic
Commonwealth	13,000	Canopic
New England	12,000	Romanic

LIVERPOOL SERVICE.

Mayflower	13,000	Cretic

In addition to the Cretic, the Liverpool service will have the Cymric, which will be transferred from the New York service of the White Star Line. The Republic is a new ship, and has never been used. The Canopic, Romanic and Cretic have been in service for a year or two, and are therefore practically new. They will be improved in interior equipment. The Dominion Line's sailing dates for the Mediterranean service will be preserved, but others will be added in sufficient numbers to make up a fortnightly schedule. The regular fortnightly schedule of the Liverpool service will be continued until further notice. Both the White Star Line and the Dominion Line are constituent companies of the International Mercantile Marine Co. (commonly known as the shipping combination). The transfer of the Mediterranean service of the Dominion Line has been expected for some time, but the announcement that the Liverpool service had been taken over also was more of a surprise. One object of both transfers is believed to be to raise the standard of the service. The new arrangements will go into effect in December.

A ladder dredger, entirely worked by electricity, has been recently built by A. F. Smulders of Rotterdam to the designs of Bruman-Varilla. The dredger is intended for use on the river Esla in Spain. The necessary current for driving the whole of the machinery, including the propeller gear, is derived from a generating station on shore, being led to the vessel by cables. The chain of buckets is driven by a three-phase motor of 30 K. W. It is, like the motor working the pile gear and the ladder crane, designed to run at 600 revolutions per minute, the necessary reduction in speed being effected by gearing. The pile gear is employed for driving two vertical steel piles by which the dredger is temporarily anchored and shifted or swung round from one position to another with the aid of propellers, which are arranged aft, the piles being forward. Mooring chains, etc., are thus dispensed with.

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TURBINE YACHT EMERALD.

Mr. George J. Gould, owner of the turbine-driven yacht Emerald, was recently asked for his opinion as to the merit of that mode of propulsion. He replied that he believed the turbine to be the engine of the future. Regarding the technical merit of the turbine, however, he referred the questioner to Capt. Donald Tod, the Emerald's skipper. According to Capt. Tod the Emerald is a distinguished example of what a yacht should be, a highly comfortable craft without vibration. Of the economy of the vessel Capt. Tod said that while the engine room force which had the care of the turbines and all the auxiliaries, consisted of three engineers, two less than a triple-expansion engine of like power and the same auxiliaries would have required, there was no saving in coal consumption. In fact he said that the turbines demanded more coal than would have been needed for an ordinary engine performing the same task. However the shortened engineer force evened the balance.

The Emerald is a large yacht, being 236 ft. over all and 29 ft. beam. She is equipped with three Parsons marine turbines operating three shafts and three propellers, arranged in the usual fashion. When the Emerald began her career she was equipped with five screws, two on the starboard shaft, two on the port and one on the central shaft. But the expected results were not achieved by this arrangement, so the forward propellers in the two wing shafts were removed, and it was thus that she came to American waters. In England with the five screws her best speed was 14½ knots, but with the removal of two of them a full half knot was added. The turbines lie well aft and are side by side the central, or high pressure one, being a bit more forward than its mates. They are about 10 ft. long and have a diameter approximately of 3 ft. The indicated horse power of the three is 1,500. As an idea of the speed with which it is possible to revolve the turbines, those to starboard and port make 870 revolutions a minute and the central one 575. Speaking of the performance of the Emerald Capt. Tod said:

"The yacht was built for comfort from a yachting point of view. To insure this in its greatest measure, and to make the Emerald a floating home, it was necessary that there should be no vibration of engines to be a constant source of annoyance. It is to be taken literally when I say that aboard the Emerald there is no vibration at all; the only noise one hears is from the auxiliaries, the pumps, dynamos, and the like. Even in the after-rooms all one hears is the not unpleasant hum of the machinery. Throughout the season there has been no hitch of any kind and no broken parts. On the upkeep of the turbines we have not expended 5 cents since April 1. The Emerald's voyage across the Atlantic thoroughly tested her, as we had bad weather all the way. So far as this yacht is concerned, the turbine is a success. Of course, one looks for improvement—there is no perfect reciprocating engine—and the Emerald's engines come very near to being perfect. In a yacht there are several questions to be considered, the most important of which are room aboard, weight, as affecting displacement; staff and upkeep. Under all these heads the turbine has had the advantage. The space occupied by the engines of a yacht to do the work of the Emerald is at least 10 ft. greater, both vertically and laterally. The weight of the Emerald's turbines is infinitely less than that of the triple expansion engine.

"There was a question some time ago in the matter of reversing turbine engines, but that has been overcome in the Emerald by the installation of reversing turbines. The after parts of the two wing turbines of the Emerald do the reversing. When going ahead they revolve in vacuum; when the yacht is sent astern the forward parts of these turbines revolve in vacuum. Concerning the economy of the Emerald's turbines, so far as coal consumption is concerned, a triple expansion engine would probably use less coal, but as the engine force is reduced to three men instead of five, this is equalized. There is no trouble about oiling bearings, as the turbines revolve in an oil jacket, which is in turn surrounded by a water jacket to keep the oil cool. The only care required is to keep the oil tank at a certain level.

"There have been several recent successes in marine turbines. The King Edward, which has a run of 120 miles on the Clyde, has fulfilled all the hopes of her builders, and the Queen Alexandra, built since, is also an assured success as compared with the side-wheelers of equal size. There is also the Calais-Dover boat, which makes the run across the channel in fifty minutes. She has exceeded all guarantees and makes 21 knots in service. Recently a test was made of her reversing gear, and when she was going at a speed of 21½ knots an hour her turbines were reversed full speed. She came to a stop in 700 feet, or twice her length. One couldn't begin to do this with a liner of equal size. On a small vessel like the Emerald, when one is below, one really cannot tell whether she is moving or not, so noiselessly do the turbines act."

The possibility of rendering the Rhine navigable by steamships between Strasburg and Basle is again being discussed. In a recently published brochure Herr Rudolf Gelpke, who has made a careful investigation into the conditions, gives it as his opinion that the upper Rhine admits of being made navigable for large boats. A trial voyage, undertaken at the instance and expense of certain colliery and shipping firms at Frankfort, Duisburg, and Ruhrort, with the steamer Justitia, has, says the Kolnische Zeitung, given practical proof of the correctness of Herr Gelpke's views. It is said to be sixty years since a steamer entered Basle.

TURBINE SCOUT SHIP FOR THE NAVY.

The recommendation for the experimental installation of turbine engines in a 5,000-ton cruiser, or scout ship, made by Admiral Melville on the day that he retired from the navy department, has resulted in a decision by the department to appoint a special board to examine carefully all available data with regard to the work of these engines, to inspect a number of vessels in which they have been installed and to prepare an estimate to be submitted to congress for an appropriation for a vessel of at least 5,000 tons to be equipped with turbines. The board will determine whether the funds now at the disposal of the department will defray the cost of installing turbines in a torpedo boat or other smaller vessel, and if this question is decided in the affirmative, practical tests may be made without waiting the action of congress. In any event the department proposes to take immediate steps to settle the question of the availability of this type of engine for use in the United States navy and it is probable that at a comparatively early date one or more vessels will be equipped with turbines as the basis of elaborate and exhaustive tests. The personnel of this special board will shortly be announced. The board will devote its attention especially to determining the accuracy of the deductions drawn by Admiral Melville from his own inquiries as to the efficiency of this type of engine. As recently set forth in the Review the chief points of merit in the turbine according to Admiral Melville are:

"With a turbine little or no care or precaution is required in starting or reversing, and these operations can be performed as rapidly as the necessary valves can be manipulated. Turbines are now reversed by means of a supplemental set of reversing blades and nozzles to which steam is admitted when desired. As the propellers used with turbines are smaller than those with reciprocating engines, the tips of the upper blades will be more deeply immersed and less likely to be uncovered by the pitching of the vessel, so there will be less possibility of racing. But even if racing does occur there will be no risk of serious injury or breakdown as with a reciprocating engine. There will be little or no vibration caused by the turbine and the vibration from the propellers will be greatly decreased by reason of their smaller size. This absence of vibration and perfect balance of the parts will allow much lighter engine platforms to be used. The absence of all interior rubbing parts will allow highly superheated steam to be used, which cannot be done satisfactorily with the reciprocating engine; this in turn will add greatly to the economy of the turbine. As most water tube boilers are well adapted to the use of superheaters, it is very probable that the introduction of turbines will quickly be followed by the use of superheaters for marine work.

"As each turbine has but two bearings there is nothing to get out of line in the turbine itself; in the case of a reciprocating engine there are generally four main bearings that must be kept in perfect alignment and reciprocating parts that must be kept in right angled alignment with the main bearings. As the turbine would have but two bearings any working of the vessel would not disturb it and could only tend to throw it out of adjustment with the line shaft; this tendency, however, would be no greater than is now the case with the reciprocating engine. The absence of all working parts except a few of the very simplest description, and especially the absence of linkages and interior rubbing parts in the steam spaces, reduces the cost and labor of upkeep to the minimum; this, though important, is not so important in the case of a naval vessel as is the ability to keep the sea almost indefinitely without laying off the engine for repair. The lubrication of a turbine is almost ideal, since the absence of adjustable bearings permits forced lubrication without appreciable loss of oil or any of it being carried into the condenser by the exhaust. The same oil can be pumped through the bearings over and over again, being cooled in passage by a water coil."

The directors of the Manchester Liners, Ltd., in their report for the year ending June 30, 1903, state that the year just passed has been one of very severe depression in the ship owning business, freights generally having been very remunerative. The depression has been most keenly felt in the Canadian and North Atlantic trade in which the greater number of the company's vessels are regularly employed. During the year the company lost two vessels. To maintain the efficiency of the fleet, and to take advantage of the low prices of tonnage prevailing, the directors have contracted for five new steamers, one of which was delivered in July. On completion of the other vessels the company's fleet will consist of fourteen steamers, aggregating 94,939 tons deadweight capacity. The profit for the past year was £34,241 9s. 8d., which, added to the balance brought forward from last year, made a total of £45,913 11s. After allowing for various charges, there was an available balance of £10,085 3s. 9d. Out of this it is proposed to pay 2½ per cent. per annum on the ordinary shares. There was a balance to be carried to next account of £4,979 19s. 11d.

Secretary George B Cortelyou of the department of labor will ask congress for a $7,000,000 building to house his department. He thinks it will be economy to build big in the first instance and points to the fact that the new post office building, finished only three years ago, is already too small, the department being compelled to rent an outbuilding. In fact nearly all of the departments in Washington are renting annexes.

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TROUBLE WITH MASTERS AND MATES.

A condition exists on the great lakes today which probably has never had its parallel in the history of lake commerce. For the first time vessel owners are having trouble with their masters and mates. The mates began deserting the ships of the Pittsburg Steamship Co. because Capt. Frank Rae of the steamer Clemson of the Provident Steamship Co. was employing a non-union man as mate. The connection of this incident with the Pittsburg Steamship Co. lies solely in the fact that Mr. A. B. Wolvin is the manager of both companies. Mr. Wolvin declares upon his honor that none of the men of the Pittsburg Steamship Co., which is the lake end of the Steel Corporation, has ever come to him with a grievance. When the mates began deserting the steamers of the Pittsburg Steamship Co. Mr. Wolvin ordered the vessels tied up. As soon as the mates left a vessel Mr. Wolvin discharged the crew with the exception of those who were absolutely required to lay the vessel up for the winter. This action was a considerable surprise to some of the masters who had not expected such peremptory suspension of their services. As no licensed mates are retained on barges, Mr. Wolvin later decided to keep the barges of the Steel Corporation, numbering over forty, in commission and made arrangements with the independent vessel owners to tow them. The vessel owners consented to this as a business proposition purely, for indeed it does not differ in any degree whatever from the business of carrying contract ore for the Steel Corporation. Accordingly a number of independent steamers left with Steel Corporation barges in tow. A day or two later the business agent of the Masters & Pilots Association visited the vessel owners and requested them to decline to tow the barges. He made no threats whatever; but one or two members of the association intimated that there would be trouble if the practice continued. The vessel men, however, insisted upon their right to tow the barges. Some of the masters of the independent vessels did not like the idea of towing the barges, but nevertheless they did not decline to obey orders. The first case of actual friction came when the steamer J. M. Jenks was sent from Conneaut to Huron to pick up the barge Martha. Both mates telephoned their owner, but after considerable wrangling the Jenks went out with her tow.

A meeting of the vessel men was held in Cleveland on Tuesday and decided to take the tows even if it led to a general tie-up. The following resolutions were adopted:

"Whereas the present strike on the great lakes seems to be without cause or justification; and

"Whereas it is important for the future carrying trade on the great lakes that the owners of the vessels should unite in all proper manner and insure a successful continuation of their business without vexatious interruptions.

"Now be it resolved that the owners here assembled pledge one another to united action even to the extent of laying up their boats if necessary; and be it further resolved that a committee of five to devise ways and means be appointed by the chair."

The chair thereupon appointed a committee consisting of A. B. Wolvin, J. C. Gilchrist, C. L. Hutchinson, J. H. Sheadle and H. Coulby. The first step which the committee took was to call all the masters that they could conveniently reach to Cleveland for a conference. In fact, a number of the masters of the Pittsburg Steamship Co.'s vessels were already in the city and they were by no means pleased with their enforced vacation and were inclined to denounce those who had precipitated the controversy. Several of the masters of independent vessels were unfavorably impressed with the affair also and hope was expressed that their united influence might be exercised to call the fight off. It can't really be called a strike, so for want of a better word it must be called a fight. The members of the Masters & Pilots Association who had been called to Cleveland, therefore met on Wednesday, but they accomplished nothing and adjourned to hold other sessions. A committee was appointed to confer with Mr. Wolvin, but as Capt. Charles Maytham was a member of it he declined to meet with it. Mr. Wolvin added that he would be glad at any time to confer with the employes of the Pittsburg Steamship Co.

The first steamer to be tied up under the plan agreed upon by the vessel men was the H. C. Frick of the Mitchell fleet. She was ordered from Conneaut to Cleveland to pick up a tow, but the mates, after conferring with Mr. Mitchell, said that they would stand by the association and thereupon quit the steamer at Cleveland. The master of the steamer J. M. Jenks, which left Huron with the Martha in tow, was compelled to anchor in the Detroit river because his mates declined to stand watch. He had taken the steamer as far as he could alone.

This, then, is the situation as it existed on Thursday morning. What the outcome is going to be it is impossible to predict. There is no doubt whatever but that the affair is greatly regretted by a number of masters; but the determination of the vessel men to stand by each other is unalterable. They are looking upon it in purely a business light. Of course, from the vessel owner's standpoint there is a grave moral question involved, and this is the covering of the movement of contract ore. How much there is of this to be moved it is impossible to ascertain, but the amount is probably not considerable. Undoubtedly adequate means will be taken to safeguard this feature of the situation.

THE FREIGHT SITUATION.

Of course the labor disturbances on the lakes have made all calculations go by the board as to the total movement of ore. With the Steel Corporation movement well in hand, as it apparently is, the fall slump is rather expected now and the total movement is predicted to be below rather than above the twenty-five million mark—that is, granting the vessels are to remain in operation at all. The tie-up of a considerable portion of the Steel Corporation fleet has stimulated the freight market. Ore tonnage is in good demand on Lake Superior and vessels are getting excellent dispatch at both ends. Cargoes continue to be scarce at Escanaba and brokers are having some trouble placing vessels there. The coal trade, too, is being pretty well covered by contract vessels so that chartering is extremely light. The grain trade has taken the expected brace as far as the rate is concerned, wheat going to 2 cents, but the commodity is still scarce. Corn was marked up to 1¼ at Chicago and indications are that it will soon advance again.

CONSOLIDATED LAKE SUPERIOR PLANTS CLOSED.

The great group of industries established at the Sault by Mr. Francis H. Clergue and his associates under the general title of the Consolidated Lake Superior Co. has been closed down. First of all came orders from Mr. Cornelius Shields to close the steel mill, an order which was received with some apprehension; later it was followed by a wire from him to close the entire group of plants and this produced a momentary panic at the Sault. Notices were also posted that no money for wages would be forthcoming until Sept. 28, and as the men were pouring in from the mines and the woods by the hundreds the authorities deemed it advisable to augment the police force. But while much discontent was manifested there was no violence offered. The Consolidated Lake Superior Co. has an authorized capital of $117,000,000, of which $35,000,000 is preferred stock. Its financial embarrassment began in December last owing to extensive operations and payments for the completion and improvement of the subsidiary companies. Speyer & Co., as managers of a syndicate, loaned it $5,050,000 in March last, and a repayment of the loan, which fell due in July, was attempted by means of an issue of bonds at 60, which completely failed. Other attempts to raise money to meet the loan were made through banking institutions, but these also failed. All the securities of the subsidiary companies were pledged with Speyer & Co. for the repayment of the loan and the company therefore became completely at the mercy of these bankers. A meeting of the directors of the Consolidated Lake Superior Co. was held in New York on Monday to evolve a plan whereby the company could be saved from a sale under the terms of the note given to Speyer & Co., but the directors were unable to project any plan whatever. After the meeting Vice President Sanborn made the following statement:

"We have failed in our efforts to raise money for the preservation of the company's assets and it is for Speyer & Co. to determine the future of the Consolidated Lake Superior Co. We have no hope now of retaining an interest in the property unless Speyer & Co. and the syndicate give us a chance to participate in the sale which is to follow. The loan fell due three months ago and it is only right to say that Speyer & Co. have extended the payment from that time on and have put no pressure on us for the money. They have not even asked us today how the matter was coming out and had no representative at the meeting, although they are on the board of directors. The company, of course, will continue to exist although it has no assets. All the securities of the subsidiary companies were pledged with Speyer & Co. for the loan which they made."

Charles H. Tweed of Speyer & Co. when informed that the directors had given up hope of paying the note, said:

"We have tried to help the company out so far as it lay in our power to do so. Our course now will be to sell at public auction the assets, consisting of the securities of the subsidiary companies pledged under the collateral note. These securities will be put up at auction and sold and the syndicate will be reimbursed from the proceeds. We have no plans for the opera-

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tion of the company in the interim, as that is not, of course, a part of our business, and in fact we have not decided on the time or condition of the public sale."

It should be borne in mind that in addition to the loan of $5,050,000 there are prior liens against the property of $4,500,000, so that if the property goes to Speyer & Co. it goes for not less than $9,550,000. The securities given as collateral for the loan were those of the Lake Superior Power Co., capital $2,000,000; Michigan Lake Superior Power Co., $3,500,000; Sault Ste. Marie Pulp & Paper Co., $2,000,000; Tagona Water & Light Co., $200,000; Algoma Central railway, $10,000,000; the North Shore & Manitoulin railway, $10,000,000; the International Transit Co., $150,000; the Trans St. Mary's Traction Co., $400,000; the Algoma Commercial Co., $10,000,000; the Algoma Steel Co., $20,000,000, and the British American Express Co., $100,000.

Reports were published in Canada and in New York that the efforts to secure sufficient financial assistance to tide the company over its difficulties had been defeated by rival steel interests, but no evidence supporting these reports could be obtained. Mr. Francis H. Clergue, the projector of the enterprise, was at the Sault during the week and it was reported that he was endeavoring to gain possession of the nickel reduction works. Meanwhile the stock of the company has declined to 3½ for the preferred and 50 cents for the common.

CAPT. STANNARD'S LICENSE SUSPENDED.

An incident which is of considerable interest to marine men recently occurred in Cleveland harbor. Maj. Dan C. Kingman, corps of engineers, United States army, in charge of Ohio harbors on Lake Erie, built a small tug named Quest for use in government work. There were many applicants for the position of master and engineer on this tug, and papers were filed by them with the local board of civil service examiners in accordance with the civil service rules. Under these rules officers are not required nor allowed to question an applicant as to his religion, politics, or affiliation with labor unions. The men chosen to fill the positions were therefore taken without reference to any of these points, and the engineer was the first man to be appointed. He was sent to Ashtabula to take charge of the boat, after being warned by Maj. Kingman that he was a government officer and that his duty was to the United States first and above any other association which he might have. It then developed that he was not affiliated with the unions, but had been one of the so-called "strike breakers" in the employ of the Great Lakes Towing Co. last season. Upon his appearance at Ashtabula the other tug men took every means in their power to make life disagreeable for him and in fact to drive him off the work. When the tug was brought to Cleveland, Capt. Arthur D. Stannard was chosen master and pilot because of his high standing in the civil service examination and of his general good appearance. After accepting the appointment, however, he refused to work with the engineer. His place was accordingly filled by the appointment of Capt. Frank T. Harlow. Some of the tug men at Cleveland at once began a crusade against the boat and its officers, heaping all kinds of insults upon them, blowing the so-called "scab whistle" whenever the boat passed them, and in some cases, boasting that they would drive the crew from the boat. Maj. Kingman demanded an investigation by the supervising inspector of steam vessels, and several of the tug men were summoned and reprimanded, which for a time stopped the trouble.

Meanwhile, Capt. Stannard had been appointed master of the tug Marguerite and the culmination of the trouble came one day when the Quest met the Marguerite in the river. The Quest blew the proper passing signals which were not responded to by the Marguerite. The signals were then twice repeated and still met with no response. Capt. Stannard is charged with heading his boat directly for the Quest and a collision would have taken place had not the latter been quickly handled. As the boats passed each other Capt. Stannard and his crew are claimed to have heaped all kinds of abuse upon the crew of the Quest. This matter being reported to Maj. Kingman under oath, was immediately taken up by him and forwarded through the proper channels at Washington for investigation.

At about that time, the president called upon the various officers throughout the country to make inquiries as to whether labor unions were in any way interfering with, or attempting to control works conducted by the United States, and this case happening just then, rigid instructions were sent from Washington to take up the Stannard case and prosecute it to the limit. An old statute was brought to light to the effect that any men found guilty of conspiring together to hinder an officer of the government in the discharge of his duties, should be imprisoned in the penitentiary for six years. Evidence was produced at the hearing tending to show that Capt. Stannard and his engineer had conspired together to compel the crew of the Quest to leave the boat and the city.

The facts in the case made a very strong presentment against Capt. Stannard in several particulars: First, he did not answer the passing signals in a narrow channel, as the law directs; second, he used indecent and filthy language against an officer of the United States; third, he brazenly insulted the flag of the United States, and a department of the United States government which owned and operated the boat while this same United States government provided him a license by which he earned his living.

After passing through the various departments the papers were returned to the local inspectors of steam vessels for investigation. Capt. Stannard appeared before them pleading not guilty, but upon being confronted with the evidence and gravity of his offense he finally pleaded guilty and threw himself on the mercy of the inspectors. At this juncture Maj. Kingman addressed the inspectors to the effect that as the representative of the war department and as one brought up from boyhood to respect the flag and government under which he lived, he desired a conviction. However, as Capt. Stannard plainly showed his remorse at the hearing, he requested the inspectors to make the punishment as light as their oaths would allow, saying he was convinced that Capt. Stannard, who is a young man, had gone further than he had intended and that in his zeal for unionism he had overlooked the fact that he was guilty of an offense against the flag.

The violation of the law in not answering passing signals is of itself a very serious offense which, added to that of indignity shown the flag and property of the United States, and to that of conspiracy against United States officers, would certainly have resulted in the entire revocation of Capt. Stannard's license, had not Maj. Kingman spoken in his favor.

The inspectors said they wanted to impress upon tug men and others along the river that government vessels are not a part of the merchant service and that an offense against such vessels is far more serious than against others. Capt. Stannard's license was suspended for sixty days.

CHICAGO GRAIN REPORT.

Chicago, Sept. 23.—After disposition of surplus room by the heavy shipments of past several days, as will be noted below, the lake freight situation is taking a natural turn for the better and at this writing market is @1¼c. corn for Buffalo, Port Huron and Georgian Bay with a strong tendency and to Montreal, etc., nominally 3¾c. @ 4c. corn. Throughout the west and northwest weather conditions are most favorable both in point of satisfactory maturing of the growing crops and disposition to more ready marketing of country holdings, and incidental thereto the decline in market prices here during past few days finds a very beneficial effect in the establishment of a substantial shipping basis that looks to assure a prolonged healthy movement. In moderate estimate during past few days seaboard and New England cash corn people have taken some 3,000,000 bu. and there is likewise good inquiry in oats and wheat quarters. Shippers are going a little slow on their future sales because of the possibility of the disturbing element with the Steel Corporation extending itself to vessels generally. The present basis of 1¼ cent corn rules very strong and will, sales continuing active, probably reach 1½ cents.

Of the shipments noted for this week there was via rail some 50,000 bu. wheat, 170,000 corn and 500,000 oats; via lake for Buffalo and other American points 367,000 bu. wheat, 2,100,000 corn and 600,000 oats; and to Canadian points via lake some 120,000 bu. wheat, 640,000 corn and 270,000 oats. The shipments, lake and rail, together with stocks of grain follow:

	Week just closed.	Last week.	Same week last year.
Wheat	561,652	471,865	865,772
Corn	2,903,701	2,038,014	1,155,250
Oats	1,365,499	1,850,708	1,281,926
Rye	3,005	1,830	86,896
	4,923,857	4,362,477	3,389,844

	Shipments since Jan. 1, 1903.	Same time last year.
Wheat	14,320,984	24,485,666
Corn	61,365,977	29,799,021
Oats	47,906,436	40,965,936
Rye	328,458	1,928,116
	123,921,855	97,178,739

Stocks of grain show a considerable advance over those of last week. The figures are:

	Week just closed	Last week.	Same week last year.
Wheat	6,884,000	6,215,000	7,808,000
Corn	5,729	5,002,000	1,589,000
Oats	3,110,000	3,888,000	3,461,000
Rye	352,000	435,000	213,000
	16,075,000	15,540,000	13,071,000

The Michigan Steamship Co. has decided to accept the steamship Eastland from the Jenks Ship Building Co. of Port Huron, Mich., upon the basis that the steamer is capable of making 19 miles an hour. In other words the ship building company is to receive $240,000 for the steamer instead of $250,000, the contract basis for a steamer capable of making 20 miles an hour. Meanwhile the ship building company will install a system of forced draft in the steamer and alter the ventilating equipment. In accepting the Eastland the steamship company also decides to build or charter another steamer for the South Haven run. The company will build if delivery can be promised by April 1 next. The new steamer is to be a single screw vessel for passengers and freight trade.

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AN ENLARGED WATERWAY IS NECESSARY.

Mr. Benjamin S. Dean, a prominent attorney of New York, has written the following article upon the necessity to the state of New York and to the nation in general of an enlarged waterway to the Hudson river. He earnestly advocates the enlargement of the Erie canal to admit barges of 1,000 tons capacity. The facts which he presents are practically unanswerable and his array of statistics proves that he has given much time and thought to the question. His article follows:

"We are apt to regard the canals of this state as obsolete. The newspaper paragraphers, particularly those catering to rural constituencies, have compared the canals to the stage coach and the antiquated methods of the past, and though this is calculated to make the 'unskillful laugh,' it cannot but make the judicious grieve. But it may be suggested that we no longer use wagons in large matters of transportation. Let us then consider a few general figures on the relative cost of rail and water transportation. Fast freight lines and other expedients make it impossible to arrive at any accurate figures as to the real cost of transportation, measured on an economic scale, from any data really available, but some idea may be gathered from facts stated in the statistical abstract. The average freight rate on a bushel of wheat from Chicago to New York by lake and canal as far back as 1897 was 4.35 cents; by lake to Buffalo and thence to New York by rail, 7.37 cents; by all rail, 12.32 cents. In 1892 the foreign exports of wheat from the port of New York aggregated something over 45,000,000 bu., and the freight upon this from Chicago by lake to canal would be about $1,957,500, while by rail it would cost $5,544,000.

"We are seeking the markets of the world, and in 1897 more than 66 per cent. of our exports were made up of agricultural products, composed largely of cereals and cotton, and if our wheat comes to the port of New York charged with more than $3,500,000 freight in excess of the legitimate or necessary cost of transportation, we are handicapped in the markets of the world to this extent; we are either losing this much profit, or we are losing its equivalent in the market for our products, for however much we may deceive ourselves, there is no profit or prosperity in the waste of energy represented by the difference in transportation rates by rail and water. The Engineering News of September, 1889, published some interesting tabulations upon the relative cost per ton per mile of railroad, canal, lake, and ocean deep-water transportation for long distances, and in commenting on the same said:

ECONOMY OF LAKE TRANSPORTATION.

"In evidence of why this difference should exist let us compare one or two items. It has been aptly said, in relation to coal economy in marine steam engines, that if we assume paper to be as good fuel as coal per ton, we have only to 'burn this letter' of one-half ounce weight to propel a ton a mile by steam—in other words, a ton of 2,000 lbs. will produce 64,000 ton-miles of ship and cargo on the ocean at freight speed. The same is frequently realized by the best lake vessels. To propel one mile a freight car weighing, with load, 25 tons, takes, on an average, over 5 lbs. of coal, so that on land a ton of 2,000 lbs. only produces 10,000 ton-miles of car and load, or say, one-seventh as much. Again, a ship costs only $50 per ton, a steamer $100 per ton, and that steamer ton will be good for some 60,000 ton-miles per year, or 600 ton-miles yearly per dollar of capital invested. Were railroads equally effective per dollar of investment the eighty-one billion ton-miles and passenger miles made last year in the United States would represent a capital investment of only $135,000,000. They actually represent a capital of $9,607,000,000.

"Excluding the Canadian coastwise trade, the commerce of the great lakes in 1889 aggregated over 51,000,000 tons, of which 27,460,000 tons were cargo freight. Assuming that this cargo freight was to be moved from Chicago to New York, which is about the average distance which these lake cargoes are carried, and the choice was to be made between rail and water transportation, we will note some important facts. According to a report made to the United States senate in 1892 the average ton-mile freight rate between New York and Chicago by lake and canal in the years 1885, 1886, and 1887 was 1.81 mills, which would make the freight charges upon the assumed tonnage something over $70,000,000 for the 1,413 miles traversed. The average ton-mile rate of eighteen trunk line railroads at the same date was fixed by the statistical abstract at 9.71 mills, which would make the freight charges by rail about $240,000,000 for the 900 miles traversed, or about $170,000,000 more than by the longer water route.

UNITED STATES TAKES CARE OF ST. MARY'S FALLS CANAL.

"In other words, the saving on a single year's freight rates upon the cargo tonnage of the great lakes would pay the total cost of a 1,000-ton barge canal, with at least $80,000,000 to spare, and it is easy to see the advantage to the American producer which must result from such a saving. These figures are based upon the canal as it is, inadequate and discredited, but afford some basis for calculating the results which might be produced when we were enabled to carry 1,000 tons in each barge instead of 250 tons. It was estimated by Horatio Seymour, Jr., that each of the canal-boats now in use might be made to carry 50 tons additional burden with an added depth of 1 ft. of water in the canals, with no appreciable increase in the cost of moving the same, while a depth of 10 ft. would more than double the carrying capacity of the canal.

"Up to 1870 the United States government had done little or nothing of importance in the development of our rivers and harbors. But with the completion of the Suez canal, connecting the Red Sea and the Mediterranean, in 1869, a new era of ship canals and slack-water navigation was ushered in, and this nation took a active part in the work. In that year plans were adopted by the United States government for the improvement of the Sault Ste. Marie canal in St. Mary's river, connecting Lakes Huron and Superior, in the state of Michigan. These plans contemplated the construction of a lock 515 ft. between the hollow quoins, 80 ft. wide, with a single lift of 18 ft., and a depth of 17 ft. over the miter-sills. This improvement was made at a cost of $2,100,000, which was, up to that time, the largest appropriation ever made for the improvement of rivers and harbors. The state of Michigan, basing a loan upon public lands granted by the national government for the purpose, had previously expended about $1,000,000 in providing a canal 12 ft. deep, making the total cost $3,100,000. This was practically the beginning of the work of developing the waterways of this nation up to a common standard of usefulness, which has progressed until today, from Buffalo to Duluth there is an available channel for vessels drawing 20 ft. of water, and the harbors along this entire distance are open to these vessels. This work has by no means been confined to the great lakes.

GOVERNMENT RIVER IMPROVEMENTS.

"Important improvements have been made along the entire Atlantic seaboard and in the Mississippi river and its tributaries. The Illinois river and connecting canals have, by means of slack-water navigation, traversed the state of Illinois with waterways carrying an immense traffic, and a proposition is now before congress looking to the expenditure of $56,000,000 for further developments in the same locality. The Hudson river, from New York to Troy, has been improved, until today there is a channel over 10 ft. in depth the entire distance at low water. The national appropriations for these purposes, starting with $2,000,000 in 1873, had increased until the annual appropriation for 1883 exceeded $19,000,000, and in 1891 it was in excess of $25,000,000. In the eight years from 1891 to 1898 the aggregate river and harbor appropriations reached, in round numbers, $129,000,000, and there appears to be no disposition to change this policy of permanent improvements in our national waterways.

"The question naturally suggests itself, Why should the general government construct and maintain a canal around the falls in St. Mary's river, in the state of Michigan, at a cost of more than $11,000,000 and spend vast sums in the development of uniform harbors along the great lakes, making a free passageway for the largest lake vessels from Duluth to Buffalo, and refuse or neglect to make similar expenditures within the state of New York? If it is a legitimate use of national funds to construct and maintain a canal in Michigan, is there any reason why this might not be done with equal propriety in the state of New York? Of course, the work is larger; but its importance to the nation is larger, or, rather, the full benefit of the St. Mary's river canal and the work which has been done in the Hudson river and along the great lakes cannot be realized to the nation without bringing the Erie canal up to the highest efficiency, thus completing a practical waterway from Duluth to the seaboard.

"We have a national interest in this; it is to the interest of this nation to bring its export products to the seaboard at the least possible cost, and we look with approval upon those vast expenditures which have done so much, in spite of occasional extravagances, to reduce the cost of transportation, not only for the present, but for the future. The improvement of the Mississippi and its tributaries ought to be encouraged, but it cannot be doubted that by far the larger commerce would be carried over the great lakes and the canals to the seaboard at New York if the connecting link between Buffalo and Albany were open to 1,000-ton barges. But we also have an important state interest in this matter; we have the largest aggregated population on this side of the Atlantic to feed, clothe, and house, and we have a common interest in reducing to a minimum the waste of energies in bringing the supplies of the country to this common center, and this can be done only by making use of water transportation for all of that vast bulk freight which may as well occupy a month in transit as a few short days, leaving to the railroads the carrying trade which must be moved at higher rates of speed.

THE 1,000-TON BARGE CANAL SHOULD BE CONSTRUCTED.

"While it is, therefore, clear that the canals of this state, and especially the one connecting Buffalo and Albany, belong properly to the national system of waterways, it is obvious that the United States is not yet ready to undertake this work, though it seems highly probable that the time is coming when this will be done, if we but do our duty at the present time. The surest way to get the United States to engage in this project is to demonstrate its value, and the way to demonstrate its value is to construct the 1,000-ton barge canal, honestly and economically, maintaining it as a free waterway for the barges of 250 tons or less, but restoring the power to the legislature to fix tolls on an equitable basis for the larger boats. This will have the effect of preserving the rights and privileges now enjoyed; it will impose no tolls except upon those who make use of the increased facilities afforded by the state; it will serve to provide a revenue for the repayment of interest and the ultimate discharge of the principal if the United States does not come in and relieve us of the burden, and it will aid in bringing about this latter result by imposing the tolls upon the commerce of the northwestern states,

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which remain passive and indifferent to the justice of our claims so long as we afford them a free waterway to the seaboard. With 1,000-ton barges the saving in cost of transportation would enable the large shippers to pay a fair toll rate and still get to market much cheaper than is now possible, while the small boatmen could still carry on their business, free of tolls, at a profit.

"The question of canals is not local; it is a matter of national economy, but the state of New York cannot afford to stand still and wait for the growth of a national sentiment which will undertake this work. We must act, and in acting we must so adjust our affairs as to compel a recognition of our just claims upon national aid in the construction and maintenance of the connecting link between the great lakes and the Hudson river. The surest way is to appeal to the intelligence of the nation by affording the cheapest possible means of transportation, laying tribute upon that which passes through this state, though not heavy enough to divert it into other channels. With the growth of New York will come increasing business to the railroads, not in the carrying of bulky freights, perhaps, though this will serve to employ them during the months that the canals are not open, but in the vast tonnage which must, in the nature of things, seek more rapid means of transit. The general prosperity of the state is the surest guarantee of the welfare of all, and he is short-sighted who believes that real prosperity can ever result from extravagance in the use of individual or collective energies. We are planning, not for the profits of the immediate present, but for the magnificent possibilities of the future, and we should put aside all merely selfish thoughts, and labor for the general good of the greatest state of our truly magnificent nation. That is the duty of the present, and if we discharge this duty well we may look forward to the future in the full confidence that it will not prove disappointing."

FOR AN IMPROVED CANAL.

The Cattaraugus County Association of Buffalo at a meeting held last week adopted the following resolution concerning the enlargement of the Erie canal:

"Whereas, public waterways are universally recognized as of vast importance in aiding the development of stable industries and in regulating freight rates between commercial centers, and consequently are of general benefit to the great commonwealth of which our former home is an important section, be it

"Resolved, That we, the members of the Cattaraugus County Association of Buffalo, N. Y., heartily approving of the proposed enlargement of the Erie canal system and indorsing the proposition to construct a 1,000-ton barge canal from Buffalo to the Hudson river, earnestly urge our friends, the voters of Cattaraugus county, to support by their ballots at the coming state election the referendum bill, the passage of which is designed to carry out the proposed canal-enlargement plan. And we really believe that every acre of land will be advanced in value thereby and the said improvement will cost Cattaraugus county little and possibly nothing."

GOVERNMENT WORK AT TOLEDO.

Concerning the progress of government work at Toledo and neighboring ports, the following report is made by the assistant government engineer:

Three dredges are at work in Maumee bay widening the straight channel. The old width of 200 ft. has been dredged throughout to depth of 21 ft., but in some parts there is a very soft fill which leaves the depth a little scant. This is mostly on narrow ridges caused by the widening of the channel and will probably disappear by the material being washed into the deeper cuts. The condition of the channel at present is: From the lake to the cribs, about 4 miles, 200 ft. wide and 21 ft. deep, with an additional width of 50 ft. on each side having 17 to 20 ft. depth; and around the cribs, 200 ft. on each side, 21 ft. deep; from the cribs inward about 2 miles, width 200 ft., 21 ft. deep; thence inward 1 mile, 300 ft. wide, 21 ft. deep; thence inward to river, 1 mile, 400 ft. wide, 21 ft. deep. Over this last named stretch the red buoys have not yet been moved to indicate this depth as the dredges are still working immediately outside of it. From the mouth of the river to the Wheeling bridge, the channel is 400 ft. wide by 21 ft. deep with but one angle, off the Ironville wharves. From the Wheeling bridge to Craig's ship yard the United States dredge is now making the channel 21 ft. deep, although the natural channel in this section is upwards of 21 ft. deep on its thread and is 20 ft. deep for a good width. From Craig's ship yard up to the Lake Shore bridge, the entire length has either been dredged to depth of 21 ft. or is of this depth naturally.

Three dredges are now working on the channels of Sandusky harbor making the depth of 21 ft. over such width as the funds will allow. The new outer range, from the lake to Cedar point, has been dredged to a depth of 21 ft. for a width of 200 ft., inward to the outer end of the jetty. This channel is slightly southeast from the old Cedar point channel, at the outer end. The inner half of the straight channel has been dredged to 21 ft. for 200 ft. width; and the outer half has 18½ to 20 ft. along its axis, shoaling to 15 ft. on the extreme edges of the 200 ft. width. The dock channel has been dredged for about half its length to 100 ft. width and 21 ft. depth. The dredge is now scraping material off the rocky ridge which extends from the "Short Line" freight wharf westerly to the outer end of the main dock channel. The channel up to the "Short Line" ore docks remains about 60 to 70 ft. wide with a depth of 17 to 19 ft.

Work of rebuilding the west pier at Huron has ceased for the present, owing to lack of funds. During this year, a portion of the west pier 368 ft. long was replaced by new. A new project has been submitted to the department, which will, if carried out, materially improve the facilities at this harbor.

CANADIAN SHIPPING NOTES.

The big lift lock on the Trent Valley canal near Peterborough, Ont., will be opened for traffic early in October.

The Canadian Pacific railway will place a steamship line in operation between St. John, N. B., and Antwerp, Dec. 1.

The new grain elevator at Montreal which is to have a capacity of 1,000,000 bu. will be completed by Nov. 1. It is being built by the Steel Storage & Construction Co.

The Newfoundland government has decided to construct two new lighthouses, and a number of additional fog signal stations on the Newfoundland coast, and two new lighthouses on the Labrador coast.

H. H. Ross of Medicine Hat, Assa., built a steamer there this summer and sent her down the Saskatchewan river to Prince Albert, Sask., for service. He has arranged to build two additional steamers for the trade in 1903.

The contract between the St. John, N. B., city council and the Imperial Dry Dock Co. for the construction of a large dry dock at St. John, has been signed. It is expected that the construction will be actually commenced in the spring.

The Star Line Steamship Co.'s steamer David Weston caught fire Sept. 20, while on a trip from St. John, N. B., to Fredericton, and was totally destroyed. Three lives were lost. The steamer was valued at $25,000 and was insured for $10,000.

Capt. J. E. Porter of St. John, N. B., is negotiating with New York owners for the purchase of a steamer now in the Long Island Sound service, with a view of establishing a service which will make the trip from St. John to Fredericton and back in a day.

The steamer Newmount, built at Wallsend-on-Tyne, England, for the Farrar Transportation Co., Collingwood, Ont., has reached Montreal from Antwerp with a cargo of steel rails. The Newmount is of full canal size and will carry 100,000 bu. of grain. She will trade from Port Arthur to Georgian bay ports.

R. T. Stephens of Victoria, B. C., has built a barge and is completing three boats of different sizes for the Pacific cable board's cable repair steamer Iris, to be used at Fanning island and other points. Mr. Stephens has also secured a contract from the British admiralty for use of the submarine mines at Signal Hill, B. C.

Capt. G. P. Phillips, the Dominion inspector of steamboats for western Ontario, Manitoba and the territories, has completed a 5,000-mile trip from Edmonston, Alba., for the purpose of inspecting the twelve steamers and other vessels engaged on the stretches of navigation including the Great and Lesser Slave lakes, Peace and Mackenzie rivers.

Capt. F. W. Coates and R. J. Mosher, formerly connected with the Rainy River Navigation Co., Rest Portage, Ont., have arranged to build a large steamer at Edmonston, Alba., for service on the Saskatchenar river. The hull will be built of wood at Edmonston and the engines at Toronto. It is proposed to place three or four steamers of various sizes on the river.

The report of the harbor commissioners of Montreal shows that 511 sea-going vessels, having a tonnage of 1,196,219, visited the port last year as against 485 vessels of 962,217 tons for the preceding year. The report also shows that the number of inland vessels that arrived during the same period was 6,560 of 1,460,437 tons as compared with 5,479 vessels of 1,444,720 tons for the preceding year.

In connection with the loss of the steamer Mersey in the St. Lawrence and the loss of five lives, the coroner's jury returned a verdict of negligence against the officers, and Capt. Gagnon and Chief Officer Barras have been arrested on a charge of manslaughter. A similar charge has been laid against the owner, M. Connolley, contractor, for sending out the steamer insufficiently equipped.

The steamer Neebing, built in Newcastle-on-Tyne, England, for Marks Bros., Port Arthur, Ont., has reached Montreal from Antwerp with a cargo of steel rails. The Neebing is 256 ft. over all, 42 ft. beam, and 25 ft. depth. She is fitted with triple-expansion engines and will carry 3,000 tons dead weight. She is intended for the grain trade between Port Arthur and Kingston, and will carry 100,000 bu. on a 13 ft. 6 in. draught.

The Canadian Pacific railway steamer Princess Beatrice was launched from the British Columbia Marine Railway Co.'s yard at Esquimalt Sept. 10. The Princess Beatrice is intended for the company's route from Vancouver to Alaska and is built of wood. She is 212 ft. long, fitted with triple-expansion engines, and has accommodations for 100 first-class passengers, a large number of intermediate passengers and 700 tons of cargo.

The Midland Queen in 1902 was chartered to carry a cargo of grain from Fort William to Goderich, Ont., but the grain was not on the elevator when the steamer was ready and she sailed without it. The Midland Navigation Co. sued for damages for failure to supply the cargo and obtained a verdict. The Dominion Elevator Co. appealed and the Court of Appeal has set aside the verdict and given the elevator company judgment for $50 and costs on its counter-claim for neglect to carry the cargo.

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AROUND THE GREAT LAKES.

The Hill Transportation Co. of Sheboygan has put the steamer City of Marquette into daily service between Chicago and Waukegan.

The Craig Ship Building Co., Toledo, will, during the fall, build a steam yacht for George and John F. Craig. The yacht will be 125 ft. long.

Another assessment of 2½ cents a net ton has been made by the Lake Carriers' Association. This will make the dues for the year 5 cents a ton.

The new car ferry Grand Haven has left Craig's ship yard for Milwaukee. She will ply in the service of the Grand Trunk railway between Milwaukee and Grand Haven.

The steamer Joe which was blown ashore near Holland, Mich., last week, will become a total wreck. She was owned by Upham & Weed, Saugatuck, and was valued at $3,500.

The new revenue cutter Tuscarora, built on the seaboard for the great lakes, is now at Ogdensburg with her boilers undergoing repair. They sprang a leak while crossing the Gulf of St. Lawrence in a storm.

Capt. C. H. Cummings, commander of the steamer Mauna Loa when it ran down and sank the tug Gillen off Superior several months ago, has been absolved from blame for the accident and restored to good standing as ship master.

The Ottawa Forwarding Co. has placed an order for a steel freight and passenger steamer for service between Ottawa and Kingston. The boat will be turned out of the yards of J. & R. Weil of Montreal early next year. It will cost $25,000.

The Great Lakes Towing Co. is negotiating with the Jenks Ship Building Co., Port Huron, Mich., for a new lighter to be a duplicate of the Newman. If built the new lighter will be stationed at Port Huron. The station of the Newman is Detroit.

Mr. W. H. Cochrane, assistant general passenger agent of the Goodrich Transportation Co., has been made general passenger agent of the Michigan Steamship Co. with headquarters at Chicago. Mr. Cochrane has been identified with the passenger steamship interest of Lake Michigan for a number of years.

The new freight dock of the Cleveland & Buffalo Line at Buffalo is rapidly nearing completion and it is the hope of the officials that the work will be finished by Dec. 1. The building which the company is erecting in conjunction with the docks is a spacious one and when finished will be capable of handling all the business of the line.

The Barry Transportation Co. which has been operating the steamers Empire State and Badger State between Cleveland and Detroit, has suspended operations for the winter owing to the fact that both vessels have been tied up by libels. Rather than give bond for their release pending the call of the cases the Barrys suspended the service.

Work on the turning basins by which boats may be turned about in either branch of the Chicago river will probably not be commenced this year. Condemnation suits to acquire part of the necessary land have been delayed until next month's session of the United States court. On completing the suits pending bids will be asked for the work which will cost about $500,000.

The fishing tug Silver Spray, which was fired upon by the Canadian revenue patrol boat Petrel on Aug. 12, has had another brush with the cutter, though upon this occasion it was not fired upon. The Silver Spray saw the Petrel approaching through the fog and fled. The captain said that he was merely endeavoring to recover nets, but nevertheless he brought in 1,600 lbs. of fish.

The burned hull of the tug Champion lies in 10 ft. of water about 600 ft. westerly from the east end of Gibraltar island, and about 300 ft. from the Gibraltar shore. It is directly in the anchorage ground used by yachts and care should be used by vessels anchoring there in the night, until the wreck is removed. The owner has provided for a lantern to be placed on the wreck each night.

The schooner-rigged steam yacht Cherokee, which has been on the lakes this season, will spend several months in a cruise among the West India islands. The boat is owned by G. H. Vandegrift of Pittsburg, an official of the steel trust. The Cherokee was put in dry dock at Buffalo this week, where her stern and bow will be cut away to permit her passing through the Erie canal to New York.

Work was started this week on the new car dumper which is to be added to the coal handling equipment of the B. & O. railway at Lorain. The new machine is to be located on the west bank of the river, just below the company's roundhouse and machine shops. A dock 800 ft. long for the handling of cars will be built in connection with the car dump. The Standard Contracting Co. of Cleveland will build the dock.

The Bertram Engine Co. of Toronto are now putting the finishing touches on the Tadousac, owned by Waldie & Wright, and designed for the Canadian grain trade. The Tadousac is a full canal sized vessel, being 260 ft. long, 43 ft. beam and 25 ft. deep. She will carry 170,000 bu. grain in 17 ft. draught. Her engine is triple-expansion 17.28 and 46 by 32 in. stroke, supplied with steam from two Scotch boilers 11 ft. 6 in. in diameter and 12 ft. long.

By the opening of another season of navigation North Manitou island, in Lake Michigan, will have storm signals, and the life saving station located there will be in communication with the outside world. This will be done by extending the cable now running from Glen Haven to South Manitou island to North Manitou. This cable has already proved a great convenience to vesselmen, as furnishing a way to get news from their ships sheltered at South Manitou harbor during storms It was laid by the government last spring after years of effort to secure an appropriation.

Bankruptcy proceedings were instituted in the United States court at Detroit this week against the Barry Transportation Co. by John Monaghan, the Schroeder Paint & Glass Co., both of Detroit, and John Barry of Chicago, all creditors, who declare the company is insolvent. These proceedings are the result of a bitter steamboat competition that was started last spring, when the Barry Transportation Co. began to carry passengers between Detroit and Cleveland at a $1 rate, in opposition to the Detroit & Cleveland Transportation Co. Several libels have heretofore been filed against the company's two steamers.

Navigation on the great lakes is to be made safer as the result of improvements now being made or projected by the weather bureau. These improvements will affect the entire transportation system and afford additional protection from storms to vessels that ply their trade on the inland waters. Among the improvements ordered is the erection of a steel storm tower in Chicago. This tower is to be placed on the north end of the south pier. It will stand 50 ft. above the water level and will be furnished with a steel mast 25 ft. high. For the signal lights in the tower an electric plant is to be installed which will furnish 250-candle power for the red light and 150-candle power for the white one.

In the gale which swept over Lake Superior on Saturday last the steamer A. A. Parker foundered 4 miles north of Grand Marias. By heroic work the life saving crew from the Grand Marias station managed to save the lives of the crew. The Parker, bound from Superior to Cleveland, began leaking with the first heavy rolling incident to the storm. Steam pumps were put in service but it soon became clear that the steamer stood in grave danger. She was headed for Whitefish point but the water gaining so fast distress signals were sounded and the vessel headed slowly for Grand Marias. When the life savers reached the vessel her deck was practically on a level with the sea. The crew took to the life boats and a few minutes later the Parker sank in 20 fathoms of water. The life boats had great difficulty in reaching the shore and the tugs Westcoot and E. M. B. A. went out to help them. The A. A. Parker was one of the fleet owned by J. C. Gilchrist of Cleveland. She was a wooden vessel built in 1884. She was 246 ft. long and 38 ft. beam and was commanded by Capt. George S. White of Vermillion. She was insured for $55,000.

"WE MUST HAVE SHIPS."

Editor Marine Review: There may be other ways to stimulate our lagging merchant marine, but the subsidy way is a sure way and cheap into the bargain. Eleven-thousand-ton freighters as long and big as ocean liners, are to be put in service on the great lakes next season. Only on salt water does American shipping lag.

Of our 1903 total imports ($1,025,751,538) American vessels brought only $123,696,385 worth; and carried but $88,360,412 of the total exports of domestic merchandise amounting to $1,392,231,637.

The New York Sun prints a letter from "An Englishman," apropos the yacht races, which is probably the composition of the office cat, but which is true, nevertheless. The "Englishman" writes:

"You have the cup—your ugly silver bauble—and the 'glory' of your toy yacht victory off Sandy Hook. But Old England still holds the mastery of your ocean trade. She has 14,000,000 tons of deep sea shipping, you less than a million. You cannot move your crops or get your Yankee goods to market without giving rich toll to Liverpool and London. We have driven your clippers off the sea with our steam 'tramps;' we have forced your sailors ashore until you had to man your champion yacht with Scandinavians. You save a $500 'trophy' and go 'wild with delight;' you pay us for carrying your ocean freights and passengers $60,000,000 a year. You have the shadow, we the substance. Why should not we be satisfied if you are?"

Why not, indeed? But are we satisfied? Are the American people, with skill in seamanship surpassed by none, with steel mills and planing mills able to build the best ships afloat, and with a coast line the longest in the world, dotted with cities sending forth their products, and the products of the great country behind them, to all parts of the planet in a commercial conquest which has become the marvel of the century and the dread of every foreign competitor, are they willing that this immense and growing export trade should be carried on the ocean by the ships of competitive peoples flying foreign flags?

It would seem so from the neglect shown in congress. But we do not believe it. Some day they will take hold of this shipping problem and solve it.

Schenectady, Sept. 22. WALTER J. BALLARD.

San Francisco and Los Angeles.—Via Nickel Plate Road. Greatly reduced fare Oct. 7 to 16 inclusive. Tickets good to return till Nov. 30, '03. Get special features including stop-over privileges, etc., from nearest Agent or address E. A. Akers, C. P. & T. A., Cleveland, O. Oct. 15. 166

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MORGAN'S SHIPS CANNOT BE SUBSIDIZED.

Editor Marine Review: Of course, the specter of Mr. J. Pierpont Morgan and his shipping trust is being promptly invoked by the interests opposed to the new movement for the revival of the American merchant marine in foreign trade. That is simply one of the things that were anticipated and inevitable. It is not likely, however, to frighten the same persons more than once if a frank inquiry is made into the real size of the specter, and the materials of which it consists. Mr. Morgan's International Mercantile Marine Co. is the greatest steamship corporation in the world. This fact, which has been sufficiently emphasized, has misled many people, especially in the middle west, into the belief that Mr. Morgan has gathered into his mighty syndicate most of the meagre deep sea tonnage of the United States. This belief is a delusion. Only a small, a very small, part of the fleet of the International Mercantile Marine Co. holds an American register, and these few vessels make up only a small part of the registered tonnage beneath the American flag.

The exact composition of the great Morgan fleet is shrouded in no mystery. It is declared fully on pages 404 and 405 of the annual report for 1902 of the United States commissioner of navigation, Hon. Eugene T. Chamberlain. The commissioner there publishes a complete list of the steamers, with their tonnage, nationality and speed, the year in which each was constructed, and the line to which each belongs. There are 136 vessels, all told, in this list, and of these only sixteen are classified as American. Since the list was published, two steamers, both American—very large vessels, building at the yard of the New York Ship Building Co., Camden, N. J., have been disposed of to the Pacific Mail Steamship Co., and several new steamships have been ordered, all of them in Great Britain. The International Mercantile Marine Co.'s fleet now stands practically at 140 vessels, only fourteen of which, or just one-tenth, are entitled to fly the stars and stripes. But four of these fourteen vessels, the Ohio, Indiana, Pennsylvania and Conemaugh, are now in the Pacific engaged in coastwise trade, so that for all purposes of international comparison the American proportion of the Morgan fleet shrinks to ten steamers out of 136,—most of these bearing British, and a few Belgian, colors.

These ten American steamers of the Morgan combination are the four American liners, St. Paul, St. Louis, New York and Philadelphia (which are now subsidized under the postal aid law of 1891 to carry United States mails to Southampton), two Red Star liners, Finland and Kroonland, and four Atlantic Transport liners, Maine, Massachusetts, Mississippi and Missouri. Their tonnage is as follows: St. Paul 11,629; St. Louis 11,629; New York 10,674; Philadelphia 10,668; Finland 12,760; Kroonland 12,760; Maine 8,000; Massachusetts 8,000; Mississippi 8,000; Missouri 8,000. Total 102,120.

The total tonnage owned by the Morgan combination is 1,100,000. Only about one-eleventh of this, therefore, is eligible for protection and encouragement under any new shipping legislation that may be passed by the United States. For it should be borne in mind that not one ton of Mr. Morgan's foreign shipping —and ten-elevenths of his tonnage is foreign—can become American save by a special act of congress, requiring the assent of a majority of the senators and representatives. In the present state of public sentiment on the "free ship" question, and especially in view of the impending shutdown of American ship yards for sheer lack of work, such assent would manifestly be impossible.

But this is not all. By the ironclad terms of his twenty-year agreement with the British government, Mr. Morgan has bound himself to keep his British ships British in every particular, and also to build their successors in British yards. So that even if the impossible happened, and an act opening American registry to Mr. Morgan's British steamers passed the senate and house and was signed by the president, it could be vetoed off-hand by the British Board of Trade—and a quick and sharp veto would certainly be forthcoming.

So the Morgan specter as a reason why we should not protect the one American interest now unprotected shrinks to rather a feeble kind of hobgoblin, when the Morgan fleet is analyzed. Only one-eleventh of the trust tonnage, or 102,120 out of 1,100,000 is eligible to American encouragement. And this 102,120 tons, representing the small United States share in the trust fleet, is, in turn, only a fraction of the total American tonnage of 873,235 registered for over-seas carrying.

These are facts that are well worth remembering—that the Morgan fleet is only one-eleventh American, and that this one-eleventh represents only one-eighth of the small American merchant marine now available for commerce with foreign lands. In the seven-eighths of American deep sea tonnage outside of the Morgan trust are included the fine steamers that convey the United States mails to Cuba, Mexico, Jamaica, Venezuela, the Isthmus of Panama, Australia, Japan and China, the cargo ships that trade across the Pacific from Puget Sound to Asia and the Philippines, our few tramp steamers, and the deep sea square-riggers and fore-and-aft craft that against heavy odds still maintain the old traditions of American seamanship.

These independent ships and shipowners that make up seven-eighths of the present American merchant marine in off-shore traffic are the interests that ask a reasonable share of the protection and encouragement bestowed by our nation on every other industry. The fate of our independent ship owning for ocean trade, unless something is quickly done to give it fair play against its often-subsidized, cheap-wage alien rivals, can be conjectured from the sinister fact that not for two years now has one new order for a steamship for this ocean trade been placed in any American ship yard. Never before in our history, not even in the midst of war, has American ocean ship building suffered from such complete paralysis. The few new keels anywhere being laid are those of either men-of-war or coasters.

Boston, Sept. 22. WINTHROP L. MARVIN.

COAL STORAGE UNDER WATER.

A recent number of the London Times contains a long and interesting letter on "Coal Storage Under Water," by Mr. John Macaulay, the general manager of the Alexandra Docks & Railway, Newport. Coal stacked in the air loses in a few years between 10 and 12 per cent. in steam raising power; in hot climates the loss is greater. As a result of experiments Mr. Macaulay has found that submerged coal can be stored for two or three years under water with a loss of not more than 2 per cent. He took four coals: (1) best Monmouthshire; (2) coal that had been three years under water, dredged from corners of the Alexandra dock; (3) coal that had been ten years under water, dredged from the same dock; and (4) coal recovered by mudmen outside the River Usk (driftage from wrecks, etc.)—"river" coal, which had in all probability been under water for considerably over ten years. These different coals were tested in a locomotive hauling a known load under ordinary conditions of running. The order of value in steam raising and actual working results in which these coals came out in the tests was: 1. The "river" coal. 2. Coal that had been under water ten years. 3. Fresh coal. 4. Coal that had been three years under water.

The "river" coal was 4 per cent. better than coal mined within a week of using; the coal which had been ten years under water was 1.8 per cent. better than fresh coal; while the coal which had been under water three years had lost 1.6 per cent. of working power. "It would thus appear on the face of it," Mr. Macaulay writes, "that, upon the whole, coal actually gains from being under water for a lengthened period. Looking broadly at the question I must admit that this is hard to believe; but there can be no question as to the results in so far as these experiments go. The oldest coal gave the best results. The steam raising was prompt and sustained, the fire an ideal one, and the consumption of coal per square foot of grate area as near the theoretical factor of complete combustion as possible." It is well known that coal stacked in the air for considerable periods, particularly in hot climates, deteriorates considerably. Lord Charles Beresford is quoted as estimating the loss to be "as high occasionally as 50 per cent.," and as stating in a letter to The Times of March 25, 1902, that in his experience "a vessel would have to consume more than twice the normal amount of coal per indicated horse-power if the coal had been kept too long in store."

As regards the argument that the use of submerged (and consequently wet) coal would heighten the danger of storage in a ship's bunkers, Mr. Macaulay says, "This may be the case theoretically, but the fact is ignored in practice," and he points out that coal is shipped indifferently in wet or dry weather, and that it is often exposed to the heaviest rain for days from the time when it is put in wagons at the pits until it is tipped into the ship at the loading-port. The practical suggestion he makes is that to prevent the deterioration of coal when exposed to the atmosphere in stores or yards, it should be submerged, more especially at naval bases, it being of special importance for naval vessels to gain the benefit of the full working power of coal with the least possible loss of time. Storage in a concrete reservoir, holding, say, 250,000 tons, would, he thinks, offer the following advantages: (a) cheapness; (b) the coal could be easily got at when needed, as it would be only necessary to pump the sea water out of the reservoir. It would also be taken out quickly and economically by means of grabs; and (c) the reservoir being sunken would be less liable to injury from hostile attack. Mr. Macaulay proposes to continue his experiments under still closer conditions.

SHIP YARD NOTES.

The new marine railway of the Seattle Ship Yards Co., Seattle, Wash., is now in successful operation. It is 250 ft. long and is capable of caring for vessels up to 2,000 tons.

The Oleander, a Mississippi lighthouse tender, has just undergone a successful trial trip under the supervision of her builders, the Iowa Iron Works, Dubuque, Iowa. The Oleander is 188 ft. over all, 65 ft. beam and 7 ft. deep. She has two horizontal compound engines with cylinders 13 and 26 in. in diameter by 6 ft. stroke. Steam is supplied by two Hopkins boilers.

The Alaska Steamship Co. has closed a contract with the Puget Sound Iron & Steel Works, Tacoma, Wash., for the lease of the company's ship yard on the Puyallup river. The steamship company proposes to build three new steamers and has completed plans for the first one to cost $215,000. She will be 216 ft. over all and 38 ft. beam and will have accommodations for 250 passengers.

The Merrill-Stevens Engineering Co. is to build a new marine railway at its yard at a cost of $75,000 and to be capable of accommodating the largest vessel that frequents the port of Jacksonville. This company is about to lengthen the steamer Crescent 20 ft. She was built some time ago for J. W. Miller of Crescent City by the company but traffic has increased so rapidly that it has been decided to lengthen her.

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NEW FLOATING DOCK FOR DURBAN.

Messrs. Swan & Hunter, Wallsend-on-Tyne, recently launched a floating dock for the government of Natal to replace the one which was lost on the passage out to Durban last year. The new dock is similar to the one recently installed at Bermuda by the British admiralty. It has a lifting power of 8,500 tons and its extreme length is 475 ft. and its width 96 ft. 2 in. The distance between the guard timbers on the side walls is 70 ft. so that the dock can accommodate vessels up to 58 in. beam and while retaining a freeboard of 4 ft. 3 in. it can take a vessel drawing 23 ft. over keel blocks 4 ft. high.

The dock proper consists of three pontoons and two side walls, to which the pontoons are connected by means of moveable joints, so that any of the pontoons when required can be removed and lifted by the dock itself, thus making it self-docking in all its parts. The machinery of the dock is contained in the upper portion of the side walls, and consists of two separate but identical installations. Each installation comprises two boilers and two pumps, each pump driven by its own separate engine, and the piping arrangements of the dock are so arranged that either pump can empty the whole of the compartments on its side of the dock. In addition to this, there is a communication through the central bulkhead across the dock, so that in case of any breakdown it would still be possible to lift the dock by the engines of one side alone. The boilers are of the ordinary return tube marine type, 10 ft. long by 8 ft. 6 in. diam., and were built by Messrs. Cochrane & Co. of Annan. The engines are of the horizontal compound type placed on their sides, and connected directly on to the vertical spindle of the centrifugal pumps, which are placed right down at the bottom of the dock, directly on top of the main drain of the pumping system, the weight of the shafts and pump impellers being taken on ball bearings at the engine deck. These and the engines have been built by Messrs. Drysdale & Co. of Glasgow.

The dock itself is divided into forty-four watertight compartments, each of which has a separate pipe leading into it, each pipe being provided with its separate valve. All these distributing pipes are collected together into the main drain on which the pumps are seated, and the discharge and inlets into this main drain are governed by large screw-down valves, and by automatic flap valves outside the dock. The different compartments are all worked by means of bell cranks and rods and levers from the valve house, which is placed centrally on each wall, from where direct communication can be made to the engines, and the inlet and outlet valves, so that the valve-man standing in his house has complete control over the whole of his section of the dock. In addition to the main pumping service there is a small direct acting drainage service into all the pontoon compartments, which can also be utilized, by changing the nozzles, as a washing down service for cleaning the outside of vessels, or for filling up their tanks for testing purposes. The pumps for this service were made by Messrs. Lamont & Co. of Paisley. The valve lifting gear, and the erection of the machinery of the dock generally has been carried out by the Wallsend Slipway & Engineering Co., Ltd.

As regards fittings, the dock is supplied with the usual timber keel-blocks, and in addition has forty-six sliding bilge blocks, which can be hauled in under the vessel by means of chains from the top deck. It is further provided with four mechanical side shores, also worked by hand wheels from the top deck by means of which a vessel can be centered on the dock. Four steam warping winches, two on each wall, are provided for hauling the vessel into the dock, and numerous bollards and timberheads are provided on the face of the walls for making her fast to.

In addition to the ordinary requirements of the dock, the present one is provided with a very complete electric installation, which will enable work to be carried out on ships through all the hours of both night and day. The installation, which is placed in one of the walls, consists of a marine type boiler by Messrs. Clarke, Chapman & Co., and of two steam dynamos duplicates of each other. By means of a flexible cable the current is conveyed across the dock to the outer wall, where it is connected to a switchboard from which the different services emanate. The lighting installation consists of three circuits—first there are the standard 200-candle power lamps along the top dock of the walls, which light the dock generally; secondly, there are a series of lamps in reflectors with flexible leads, which can be carried to any portion of the dock, or ship on the dock where light is required; and lastly there are the ordinary incandescent lamps in the boiler, engine, and store rooms, and other compartments of the dock. The electrical installation of the dock is of sufficient power to enable electric drills or other machines to be taken off from the plug boxes for carrying on work on the hulls of ships on the dock, for which purpose it is possible to utilize both the steam dynamos simultaneously, in which case steam could be taken from the main boilers of the dock, for both the main and auxiliary steam services are so connected together that either may be used to supplement the other. The whole of the electric installation has been provided by Messrs. J. H. Holmes & Co. of Newcastle. The system used is the direct current at a tension of 110 volts, the electric cables being all contained in steel tubes to prevent injury, with the exception of the cable which crosses the dock, which is drawn into lead, and suitably armored. Directly after the launch the end pontoon, which was previously launched, will be connected up to the dock, when it will go through its self-docking trials, which are to consist of the lifting and replacing of the large center pontoon. After this the dock will proceed on its voyage to Durban, where it is due to arrive before the end of the current year.

ANOTHER CHANNEL TURBINE STEAMER.

Following up the endeavor to secure yet quicker transit of both mails and passengers than at present attained across the waterway dividing England and France, just initiated by the Southeastern & Chatham Railway Co. by the placing of the new turbine steamer Queen on the route between Dover and Calais, there is now to be recorded the coming of a similarly propelled vessel, the Brighton, lately launched at Dumbarton from the ship yard of Messrs. Denny & Bros. and built by that firm for the London, Brighton & South East Coast and Western of France Railway Companies Newhaven and Dieppe passenger service.

The propelling machinery of the Brighton consists of three sets of turbines, made by the Parsons Marine Steam Turbine Co. of Wallsend-on-Tyne, steam for driving them being supplied by cylindrical boilers of the Scotch type, constructed by Messrs. Denny & Co., to work at a pressure of 160 lb. per square inch on the closed stokehold system. The arrangement of the turbines is similar to that of those fitted by Messrs. Parsons to the Queen, one high-pressure turbine on the middle line of the ship, with a low-pressure one on either side of it, each turbine shaft, however, in the case of the Brighton being fitted with only one propeller, better results being obtained by this arrangement than with two on the same shaft. In maneuvering the vessel the center shaft runs free, the two side shafts then taking the place of the ordinary twin screws, the maneuvering power, as demonstrated in previous turbine vessels, being in every respect as good as in ordinary twin screws, while in going astern there is none of that objectionable vibration which is to be felt even in the most modern twin-screw arrangement.

The promenade deck of the Brighton extends the entire length of the vessel, in the center of which is a deck-house, containing at the fore end the first-class deck saloon, which is framed in light oak, with shaded panels, having an anaglypta frieze, and strap work in root veneer. The upholstery is in blue moquette, the sofas being divided off by cushioned arms, so as to form easy chairs. The floor of the saloon is laid with cork carpet, overlaid with runners, the whole design being of Sherraton character. In this deck house there are also several state rooms for the use of first-class passengers.

The first-class dining saloon is on the main deck, forward of the machinery, and extends the full width of the vessel. It is capable of dining fully fifty passengers at a sitting, the sofas round the apartment being so arranged as to be made into beds to accommodate thirty-six passengers when required. The framing is of dim polished oak, in the Elizabethan style, the upholstering being the same as in the ladies' boudoir. The center panels of the ceiling are of anaglypta, the whole being finished in tasteful shades, relieved with gold.

The midship portion of the main deck is given over to the accommodation of officers, engineers and firemen, who have benefited by the extra space available due to the smallness of the machinery hatch in a turbine steamer as compared with that necessary with ordinary twin-screw machinery. Aft of the machinery space is a second-class smoking room, a comfortable apartment fitted with sparred seats, a companion to the second-class ladies' saloon, and a lavatory for gentlemen. The after part of the main deck provides a sheltered promenade for the use of the second-class passengers during wet or rough weather.

The lower deck forward of the machinery space is fitted up as first-class sleeping rooms, one for ladies and another for gentlemen. The ladies' saloon is framed in polished oak, with incised and gilt panels, while that for gentlemen is somewhat similar in design, having a polished sycamore dado and enamelled pine above, the panels being finished in shades of French grey. The lower deck abaft the machinery is fitted for the accommodation of second-class passengers, the dados in this compartment being of fumed mahogany, and the upper framing in enamelled pine finished in shades of terra cotta.

In her trial trip the run from Newhaven to Dieppe was made in 3 hours, 3 minutes.

On Tuesday, Sept. 1, favored with truly summer weather throughout the day, the Brighton made a second trial trip, in the shape of an excursion from Newhaven to the Solent and back to Brighton, the purpose of the trip being to introduce, among others, the mayors of Dieppe, Brighton, Portsmouth, Eastbourne and Hastings, with their respective town clerks, to the new comer, and give them an opportunity of inspecting the vessel for themselves. No attempt was made to get up speed on the occasion, but for some time after leaving Newhaven pier the vessel made about 21½ knots an hour under the ordinary conditions at which her engines will be worked, her high-pressure turbine shaft running at about 520 and the low-pressure shafts at about 600 revolutions per minute, the first mentioned driving a 5 ft. 6 in. diameter screw of about 6 ft. pitch, the low-pressure screws being 1½ in. larger and slightly less pitch, the initial steam pressure at the high-pressure turbine being 150 lb. per square inch.

If the experiences of the runs on her second trip are any guide, the vibration, though noticeable, was trifling compared with that felt in most of the old twin-screw boats. The machinery, as on the contractors' trials, worked with the greatest smoothness, and as it occupies far less space than that of the ordinary type of screw engines, the boat will carry 100 more passengers in conditions of still greater comfort, and her performances during the coming autumn and winter will be of exceptional interest to all concerned in cross channel passenger and mail traffic.

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HIGH QUALITY OF BELLEVILLE BOILER.

Concerning the recent British naval maneuvers and the performance of the Belleville boiler throughout them the naval correspondent of the London Daily Telegraph says:

"Sir William Allan has rendered the boiler question in the navy one of great popular interest, and no excuse is necessary for directing attention to the results achieved by the much condemned Belleville type during the maneuvers which have just concluded. No fewer than twenty-one battleships and large cruisers which took part in these operations depended for their steam supply on these French generators. During the stay of the combined fleet at Lagos I took special pains to inquire how they had come out of the most severe test to which so large a collection of men-of-war has ever been submitted. As has been already reported, the fleet was not without its 'lame ducks,' and the Blake's Scotch boilers in particular were the cause of a most deplorable loss of life; but although the twenty-one Belleville ships covered over 2,000 miles each, and many of them considerably more, I could not learn that in a single instance the boilers had developed defects worthy of mention. None of these ships were compelled to drop out of the maneuvers even temporarily, by reason of trouble with their boilers. In view of the alarming statements which have been made from time to time this assurance may be accepted by the nation with a feeling of relief.

"These ships are not 'lame ducks,' as has been repeatedly represented. On the contrary, they have shown themselves to be good reliable steamers, far superior to ships fitted with the older type of generator, and possessing the great militant quality that they are able to put on their full speed at short notice. As I have mentioned before, the Good Hope increased her steaming from 9 to 19 knots in less than ten minutes, and in a very short time she was traveling at 22½ knots, maintaining this rate with perfect ease for four hours. The secret of success in working this new kind of boiler lies in the intimate knowledge by the engineers and the staff of its peculiar qualities. It is undoubtedly a type which needs careful handling and much attention and unremitting vigilance. Where these conditions are fulfilled it does well. In the fleet today are a large number of senior engineers who have studied the Belleville boiler, and such officers, understanding its merits and demerits, manage to achieve good results. One instance in particular deserves notice. I refer to his majesty's ship Spartiate. No ship in the fleet has a worse name. She occupied six years in construction, and the opinion was generally entertained that she would never be much good. What has experience shown? She was commissioned on March 17, and on the 26th left England for Hong Kong with a relief crew for the battleship Ocean. Two engineer officers only, Engineer-Lieutenants Edward Gaudin and Walter S. Hill, and about twenty of their stokers and artificers, had had previous experience of the Belleville boilers. The run of 9,600 miles to the far east was made at an average speed of 13 knots, and the amount of coal consumed for all purposes was 3,000 tons. Mark this, the cruiser Amphitrite used 4,200 tons for the same trip, while the Blenheim, with cylindrical boilers and 2,000 less displacement, burnt no less than 4,000 tons, proceeding at an average speed of 11½ knots only. In comparison with both these vessels the Spartiate did excellently.

"Sixteen days only were spent at Hong Kong to enable the crews of the Ocean to be exchanged, and the Spartiate men left for England under orders to carry out a series of trials on the way home. Between Hong Kong and Singapore a passage trial was made. This run occupied ninety-five hours, an achievement in traveling between these two ports which broke all previous records. Another record was established between Singapore and Colombo, the journey being made in ninety-six hours. From Colombo to Aden a speed of 13 knots was maintained, and thence to Suez the Spartiate did 13½ knots. A one-fifth power trial was carried out between Port Said and Malta on the small fuel consumption of .9 lb. per indicated horse power per hour for all purposes. A four-fifth power trial was made between Gibraltar and Plymouth, with a consumption of 1.7 lb., the journey from port to port being made in sixty hours, in spite of the fact that the ship had covered 19,000 miles, with little or no time for carrying out even minor repairs. She made a stay of sixteen days at Portsmouth, and then shipped a new crew, including stokers and artificers, and left to take part in the maneuvers. Arriving at Gibraltar, she took in 1,100 tons of coal, at an average of 200 tons an hour—a record. This was due to the organization of Com'dr Guy R. A. Gaunt, a naval officer who knows the secret of getting the best work out of any body of men. The Spartiate afterwards joined Admiral Domvile's fleet at Lagos, the base for the maneuvers. It was imperative that a fleet of cruisers should be off Madeira before Lord Charles Beresford's battleships could put to sea. Lagos and Funchal are separated by 490 miles, and it was essential to Admiral Domvile's plans that his scouts should travel at 19 knots, so as to reach Madeira before Lord Charles could escape, starting twenty-eight hours later than the cruisers were permitted to leave Lagos.

"Four cruisers were told off for this work, all having large coal-carrying capacity. They were the King Alfred, Powerful, Spartiate and Diadem. They left at eight a. m. on Aug. 5. A quarter of an hour later the King Alfred had to drop out, in consequence of an engine defect—a hot piston rod—and the Aboukir was dispatched from Lagos to take her place. Half an hour later the Powerful, fresh from a refit at Portsmouth dockyard, and manned by a strange crew, fell out of line, owing to defective machinery, not boilers, and then the Diadem, owing to hot bearings, had to reduce speed for a time, but shortly afterwards caught up to her consorts, and the three, the Spartiate, Diadem, and Aboukir, reached Madeira at 10:30 on Aug. 6, one and a half hour before Lord Charles was permitted to take his battle fleet to sea, having maintained an average speed of 19 knots. During the maneuvers the Spartiate steamed for ninety-six hours at 18 knots, and in the eight days covered by the operations traveled 2,900 miles. Tomorrow she will reach Portsmouth, having traveled 25,000 miles in a matter of five months, without developing defects in her boilers of any kind, though in the machinery department a leaky condenser gave some trouble. No man-of-war has ever done as much steaming in so short a period. This is the most severe test to which the Belleville boilers have been submitted, and it is subject for congratulation that the Spartiate has done so triumphantly, especially in view of the fact that her engine and boiler room hands have been changed three times in the five months. Her performance, in conjunction with the immunity of other ships from boiler defects during the maneuvers, supplies the best answer to those who have prophesied every evil of the Belleville type of steam generator. It may be that this boiler is not perfect. A better model may be evolved and one requiring less expert knowledge for its management, but at present it is the only one which has been thoroughly tested.

"The coming trials of the vessels fitted with the Babcock & Wilcox and Yarrow boilers are being anticipated with keen interest, and it may be that one or other will prove superior to the Belleville, but as a steam generator the high qualities of the Belleville have been amply demonstrated."

NEW GASOLINE LAUNCH WORKS AT WEST MYSTIC.

Work was begun Monday of this week on the new machine shop to be erected on property adjoining the Holmes Ship Building Co. at West Mystic, Conn., for the occupancy of the Hasbrouck Motor Works, which is to move its business, now at Yonkers, N. Y., there at once. The Hasbrouck company, reorganized and incorporated under Connecticut laws, intends to carry on the marine engine business in all its branches on a large scale. Mr. S. A. Hasbrouck, the inventor, a graduate of Stevens institute, has been working for years to perfect a reliable gasoline motor using the least amount of fuel for the greatest amount of power, simple of operation, easy to start, to run without vibration with no noise or odor and but little heat from the exhaust—all of which points are most essential to a perfect power for marine use. As to how well he has succeeded is best illustrated in the successful performances of the boats in which the engines have already been placed, namely the tender to the Reliance, speed of 14 miles per hour. This was the only launch following the New York Yacht Club's cruise from start to finish under its own power. He has also built the Loon, 13 miles, and Cricket, 15 miles.

His latest achievement is the new 32-ft. waterline launch Mystic recently built by the Holmes Ship Building Co. of West Mystic, Conn., equipped with a 16-H. P. four-cycle, four-cylinder motor weighing 500 lbs. turning up an 18-in. wheel 580 to 590 revolutions and driving the boat 15 to 16 miles per hour. This boat, claimed to be the lightest weight launch of her size ever constructed, her planking being only ¼ in. thick and all other parts of her construction correspondingly light, runs with no apparent vibration. The exhaust is absolutely odorless owing to perfect combustion, a white handkerchief held directly in front of exhaust pipe while motor is running will, when withdrawn, be as white and odorless as when placed there. The engine is started by the simple pressing of a spring and is otherwise very simple in operation and easy to control, and with a reverse clutch the wheel can be reversed when boat is at full speed and brought to a standstill within her length. But the greatest point of superiority is in the small amount of fuel consumed, which is not over three-quarters of a pint for 1 H. P. per hour or 1 2-3 gallons for 16 H. P. for 1 hour's running, showing that for a full day's run of 10 hours at top speed only 16 2-3 gallons would be required.

In the recent trip from Yonkers, N. Y., on the Hudson above New York city, to Mystic, Conn., a distance of more than 130 miles less than 20 gallons were used, while the distance from North Brother light to destination, which is about 115 miles, was made in 9 hours. The Hasbrouck company will build all sizes of four-cycle motors, from 4 to 400 H. P. and larger if necessary and in connection with the Holmes Ship Building Co. it proposes to place on the market soon a line of modern up to date launches complete in every detail, but will make a specialty of high grade, high speed, racing auto boats, to be steered and otherwise operated and controlled same as an automobile racing car.

The fiscal year of the United Fruit Co. has been a very satisfactory one. The company is fast repairing the damage caused by the hurricane in Jamaica early in August. The damage to the company's property did not reach over $175,000. The new steamer Bound Brook, built in Copenhagen for the company, arrived in Boston last week. She is 250 ft. long, 34 ft. 8 in. beam and 23 ft. deep. On her voyage across she averaged 14.7 knots.

Kaiser Wilhelm II., of the North German Lloyd Line, has just brought to New York the largest number of first-class passengers ever carried on a ship in a single trip. There were 999 cabin passengers with 5,000 pieces of baggage. Altogether there were 2,529 persons on board. This certainly is testimony as to the value of fast service. Flyers are great drawing cards for a steamship line.

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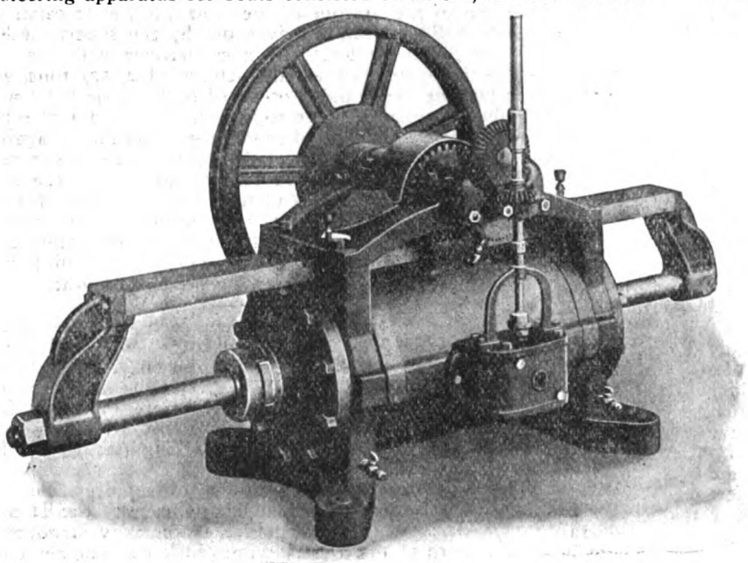
ANCIENT AND MODERN STEERING GEAR.

Perhaps there is no part of a ship's equipment so important to the vessel's safety as the steering apparatus. Sails may go by the board, propelling machinery may break down and still the ship may be manageable. But let the steering mechanism refuse to perform its functions and the vessel is veritably at sea, a prey to the waves, to be tossed hither and thither at will. The first steering apparatus for boats consisted of an oar, and this method



Steering Engine No. 1.

was used for guiding the viking ships of the bold, hardy Norsemen. It is probably not generally known, even among seamen, that it was from this mode of steering that the two sides of a ship derived their appellations "starboard" and "larboard." On the right hand side of the boat a narrow platform or plank was placed, which was raised above the rail, with a notch or oarlock in its top into which the long oar, used for steering purposes, fitted. This platform or plank was called "starboard," by the Norsemen, from steoran to stear, and board a plank. In order to designate the left from the right hand side it was called "lar," meaning lower; hence came starboard and larboard. But there being too much of a similarity in the sound of the two names, the British admiralty in 1845 changed larboard to "port," which term is now generally used.

Following the oar as a steering implement came the tiller with rudder attachment, which came into universal use, as it proved to be a great improvement on the oar, and even to this day for small craft its value is proven by its continued use.

But as man learned to build larger ships it was found necessary to improve upon the tiller which resulted in the invention of the wheel with its drum and tiller ropes. As vessels continued to grow in size the wheel, which had well served its purpose during the early days, became inadequate, as proved by the number of crippled steersmen, disabled while trying to cope with the buffeting of an angry sea. At times it became necessary, in a rough sea, to lash from three to five men to the wheel, and even then their united efforts would often prove of little or no avail.

As steam gradually superseded the sail as motive power for ships and their size and general speed increased it became apparent that an improvement in steering apparatus was needed. In fact was a necessity, and, as "necessity is the mother of invention," the steam steering gear was devised. According to information furnished the writer by a New York marine man, who has been in the business since 1866, the first American steamship to be equipped with such gear was the City of Gloucester, the hull of which was built at Brooklyn, N. Y., by Leary and cabins finished and machinery installed at Wilmington, Del., by Jackson & Sharp in 1883.

From that time various styles of steam steering gear have been invented, which, according to the Irishman's classification have proved to be "good, bad and indifferent." The good are in satisfactory service, while of the others many have never got beyond the model stage.

One among those to win favor with vessel owners, captains and pilots, who bear ample testimony as to its good qualities, is what is known as the Moulton steering engine, illustrations of which are herewith given. Engine No. 1 is designed for use on steam yachts and ocean, lake and river steam craft in general. It has been in practical use for several years and is highly commended by those who have used it.

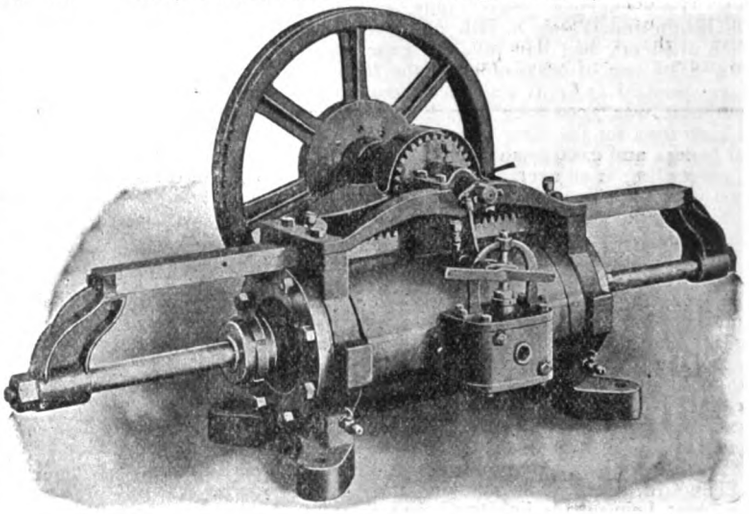
As may be seen, by reference to illustration, this engine consists of a steam cylinder—the diameter of which depends on size of vessel on which engine is to be used. A piston rod, running through and projecting from either end of this cylinder, is connected by means of yokes to a rack-bar above, which runs parallel to cylinder, this rack meshing into a pinion wheel keyed to a shaft running at right angles to rack-bar and cylinder. A double grooved sheave-wheel, the diameter of which is sufficient to make one circumferencial travel equal to the travel of tiller or quadrant, as the case may be. Over this sheave-wheel runs a wire rope which connects with tiller rods or rope. On the hub of this sheave-wheel one half of a square-jawed clutch is cast, the other half being secured to pinion shaft, which engages with wheel when machine is in use. This clutch is controlled by means of a lever, placed on the bridge or other convenient place and is used for the purpose of changing the engine from steam to hand power, should occasion arise, and by an ingenious appliance the change from steam to hand power, or vice versa can be made without the loss of a moment's time.

The value of this engine is a very simple device which with automatic attachment is absolutely steam tight, and is so arranged that a movement of the wheel in the pilot house opens the steam valve to the same degree as represented by wheel's movement, thereby setting the engine in operation to any degree desired by the helmsman. The valve returns to its center or closed position, and when the piston of the engine has completed the desired fraction of its stroke—corresponding to movement of the wheel—the valve is closed, and the engine rests until further movement of the wheel is made. The pilot house outfit consists of brass stand, wheel and indicator, the latter, working in conjunction with the wheel, constantly showing the position of the rudder, making exact steering of easy accomplishment by the helmsman.

Engine No. 2 is designed for use on harbor tugs or other craft where an extra sharp, positive movement of the rudder is needed for quick work. It is controlled by a lever located in the pilot house, is simple in construction, quick in action and extremely serviceable. With this engine a most convenient after stand is furnished, combining steering lever and bell pull, and giving control of the vessel from the after part of the house.

A noticeable feature of these engines is that while they work slowly—thus reducing possibility of breakdowns and repairs to a minimum—the action on the rudder is quick, thus producing immediate results.

There are at present twenty-five or more vessels using these engines, with most satisfactory results. The Moulton Steering Engine Co., with offices at 17 State street, New York city, have lately increased their manufacturing facilities, and are now mail-



Steering Engine No. 2.

ing an illustrated catalogue, together with testimonials, free to inquirers.

Three new battleships, the first to be designed by Mr. Philip Watts, are to be laid down at Chatham, Portsmouth, and Devonport, in April, 1904. Although the new ships closely resemble the King Edward VII. class, they mark a distinct advance in warship architecture. The displacement of these new vessels is to be between 17,000 and 18,000 tons, and the armor belt of 10-in. Krupp steel, tapering to 6 in., will be continued the whole length of the broadside, which has never yet been done in any modern battleship. They will have four submerged torpedo tubes, and the main armament will consist of four guns of 50 tons, eight wire quick-firers of 27 tons, and twelve 6 in. guns, each capable of throwing projectiles of 100 lb. each in a minute. The ships are expected to develop a speed of 19 knots an hour.

Hunters' Special Rates.—Via Nickel Plate road to points in northern Michigan and Wisconsin. Tickets on sale Sept. 15 to Nov. 15, '03, inclusive. Liberal return limit. See nearest agent for particulars or address E. A. Akers, C. P. & T. A, Cleveland, Ohio. Oct. 23 (173).

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COMMERCE OF PORT OF VLADIVOSTOCK.

The statistics relating to the maritime traffic of the Russian port of Vladivostock for the year 1902 show a slight falling off, both as regards the number of vessels and the tonnage when compared with the figures of the previous year. The Russian and Japanese flags predominate in the trade of Vladivostock while the British and German flags are losing their importance, and although the Norwegian ships were five more in number last year than in 1901, their total tonnage was a trifle less. Altogether—not including the Japanese and Chinese small sailing ships and junks, and the steamers of the Eastern Chinese Railway Co. which work in the so-called smaller coasting trade—364 vessels arrived at Vladivostock last year with a total measurement of 491,157 tons net, against 376 ships and 531,607 tons in the year 1901. The following are the shares of the different flags:

	1901.		1902.	
	No.	Tons net.	No.	Tons net.
Russian	159	285,571	164	257,024
Japanese	108	97,234	106	111,323
German	35	39,519	25	34,393
British	26	42,706	10	24,793
Norwegian	22	28,060	27	27,027
Danish	4	11,117	5	4,568
Austrian	1	1,317	1	1,937
American	17	22,899	8	16,115
Korean	4	3,184	14	9,671
Swedish	—	—	4	4,306
Total	376	531,607	364	491,157

Of the 364 vessels, 196 arrived from Chinese, Japanese, and Korean ports, 101 from Asiatic Russia and Port Arthur, thirty-seven from European Russia, seventeen from Germany, eleven from America, and only two from Great Britain. Formerly German and Norwegian vessels were for the most part engaged in the so-called free coasting trade, but the numerous lines now run by the maritime branch of the Eastern Chinese Railway Co. and the Japanese Co. have almost cut the ground from under their feet. Six separate lines are worked by the railway company's boats, all having Vladivostock for their starting and terminal points. The Russian Volunteer fleet, too, maintains a fortnightly service from and to Odessa, and indeed almost all the large Russian shipping companies participated last year in the traffic between Black Sea ports and Vladivostock. The Russian Company for Steam Navigation & Trade, for instance, despatched two steamers, the Nordish Steamship Co. of St. Petersburg three steamers, the Russian Baltic Steam Navigation Co. five, and the Russian-East-Asiatic Steam Navigation Co. five from ports in the Baltic. The foreign companies trading with Vladivostock are: The Nippon Yusen Kaisha a regular fortnightly service to and from Japanese ports; the Oie Steam Navigation Co. two separate lines with departures about once a month; the Hamburg-American Line a monthly service to and from Nagasaki, Kobe, and Hong Kong, the Northern Pacific Steamship Co. a line to and from Portland or Tacoma, in which last year there were five departures; and the firm of Kunst & Albers a monthly line to Nicolaievsk.

A statement of the tonnage of the New York state canal for the first week in September, as given out by the superintendent of public works, Charles S. Boyd, in comparison with the corresponding week of 1902, shows an increase of 27,525 tons, and this notwithstanding that a break occurred on the Erie canal west of Rome, which necessarily interrupted navigation for the last two days of the week. The total tonnage was 121,282, as against 93,757 for the corresponding period last year. The larger portion of this increase was made up of through freight, the total being 44,448 tons, as against 29,645 tons last year, and this increase of about 15,000 tons was made up of equal parts of eastern and western shipments. The anthracite coal shipments continue to be very large, the total for the week being 15,645 tons, as against 448 tons for the corresponding period last year.

Capt. J. C. Sanford, government engineer, with headquarters at Philadelphia, opened bids on Saturday last for the construction of a wooden suction dredge for use on Key West harbor. George A. Gilchrist of Belfast, Me., was the lowest bidder with a bid of $91,000. The other bidders were: Bucyrus Co., South Milwaukee, Wis., $102,880; James Reilly Repair & Supply Co., New York, $99,950; Great Lakes Engineering Works, Detroit, Mich., $106,000.

The Belleisle experiment of the British admiralty was of considerable importance from other than the admiralty standpoint. The lords of the admiralty were anxious to know whether corn pith ceilulose was a good plugging material and the Belleisle has given a very definite answer in the negative. British technical papers are in doubt whether such a plugging substance can be invented, for to be effective it must be acted upon in the minutest fraction of a second.

Chicago Excursion Rates.—One fare for round trip via Nickel Plate Road, September 26 and 28, 1903, for Chicago Centennial Jubilee. Get full information from nearest agent or address E. A. Akers, C. P. & T. A., Cleveland, O. Sept. 24 167

Denver-Colorado Springs-Pueblo, Col.—Low excursion rates via Nickel Plate Road, Oct. 3 and 4. Tickets good to return to Oct. 30, '03. Get particulars from nearest agent or address E. A. Akers, C. P. & T. A., Cleveland, O. Oct. 1 165

BELLEVILLE WATER-TUBE BOILERS

NOW IN USE (FEBRUARY, 1903)

On Board Sea-going Vessels, NOT INCLUDING New Installations Building or Erecting.

French Navy	276,460	H. P.
English Royal Navy	849,300	"
Russian Imperial Navy	193,900	"
Japanese Imperial Navy	122,700	"
Austrian Imperial Navy	32,900	"
Italian Royal Navy	13,500	"
Chilian Navy	26,500	"
Argentine Navy	13,000	"
The "Messageries Maritimes" Company	87,600	"
Chemins de fer de l'Ouest: (The French Western Railway Co.) Steamships plying between Dieppe and Newhaven	18,500	"
Total Horse Power of Boilers in Use	1,634,360	

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Works and Dock Yards of the Ermitage at Saint-Denis (Seine), France. Telegraphic Address: Belleville, Saint-Denis Sur-Seine

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ITEMS OF GENERAL INTEREST.

Rear Admiral Charles O'Neil, chief of ordnance of the navy department, will ask for $18,000,000 for ordnance for the next fiscal year.

Orders have been received by the naval officers at the Crescent ship yard to remove the cruiser Chattanooga and the torpedo boats Nicholson and O'Brien to the Brooklyn navy yard for completion.

Land has been purchased at Sumay, Island of Guam, on the harbor of St. Lucis d'Apra, for use as a naval station and coal depot. Sumay will be connected with the present headquarters at Guam by telegraph and telephone.

The naval estimates for the fiscal year 1904-1905 will approximate $100,000,000. While it is not definitely known still it is believed to be the desire of the president to continue the building program by authorizing the construction of five more battleships.

The monitor Wyoming, built by the Union Iron Works, San Francisco, and now attached to the Pacific squadron, having met all the requirements of her contract, has been accepted by the government. All of this type—the Florida, Wyoming, Nevada and Arkansas—are now in the hands of the navy.

The Russian minister of marine has ordered two tank steamers to be built in the Muhlenthal yard on the Neva, and in the Sandvik yard at Helingfors. These new steamers will be called Vodelei No. 1 and Vodelei No. 2 and they are to be used in furnishing the Pacific squadron with drinking water.

The Red Star Line announces that wireless telegraph apparatus will be placed on the steamers Finland, Kroonland, Vaderland and Zeeland. It will cost $2 per message of ten words and 12 cents for each word over ten for every message sent to the vessels, in addition, of course, to the ordinary land toll.

The French minister of marine has made a contract with the St. Chammond Steel Works for the supply of armored turrets. This fact is regarded as an official intimation that the recent trials carried out on the Suffren were extremely successful and that the French system of building armored turrets has upheld its good name.

The Japanese government has asked ship builders in Great Britain to tender for the construction of a very large battleship, the tenders to be in next week. It is reported that the Japanese government is going to build a battleship at Kure in Japan—the first ever built there—and that the necessary armor plates and guns will also be made in Japan.

Steam turbine-driven electric light sets are being rapidly adopted on board ships and such adoption appears to be becoming almost universal. Freedom from vibration, high efficiency, light weight, possibility of using high-pressure steam and freedom from wear due to absence of reciprocating parts are all advantages possessed by this type of engine which renders it ideal for ship work.

Competition between various types of submarine torpedo boats will be conducted shortly in Narragansett bay by the board of inspection of which Capt. C. J. Train is president. The last congress provided $500,000 for investigation of submarine naval warfare. Manufacturers of the Lake submarine torpedo boat are preparing their best craft for this trial and the makers of the Holland boat are also making extra efforts.

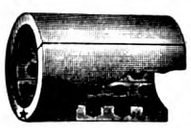
The French minister of marine has ordered a torpedo-boat destroyer and two torpedo-boats from M. Normand of Havre. These vessels will be of a new type designed by M. Normand. Their hulls will be larger and stronger than those torpedo-boat destroyers and torpedo-boats now in use in the French naval service. This will reduce their speed to some extent in calm weather, but it will enable them to put to sea during a rough time and to attain a higher speed under such conditions. Five torpedo-boat destroyers of the new type are to be built.

In the recently published annual report of the Amsterdam chamber of commerce the fact is lamented that the Dutch merchant navy has lost the paramount position it formerly held and has sunk to the tenth or eleventh place on the list, and further, that in spheres of action such as the Netherlands Indies, where Dutch vessels might easily find good employment, the carrying trade is in either British or German hands. This state of things is accounted for, the report says, by the fact that participation in the shipping trade is not popular in Holland, and that it is difficult to procure capital for its maintenance. The chamber trusts that an alteration may soon be effected in this respect, and that Dutch capitalists will pay greater attention to shipping, "which not only offers a safe investment for capital but affords good prospects of profit, provided the vessels are maintained in good condition, and care is taken to make sufficiently heavy write-offs." Some statistics are appended to the report, from which we gather that the number of merchant vessels registered in Amsterdam increased from 60 (measuring 82,544 tons) in 1898 to 152 (164,308 tons) in 1902. In the same period Amsterdam's share in the whole of the mercantile fleet of the Netherlands rose from 27 to 40 per cent. The profits gained by the Amsterdam owners last year were, however, rather meagre.

The Belleisle, hulk, which has been submitted to a series of experiments without being sunk by gun attack, was lately attacked by a torpedo in Portsmouth harbor and heeled over and sank in 20 minutes. A compartment was built outside the port bow below the water line, and this compartment was filled with corn pith cellulose. At the time of the experiment there were 10 ft. of water under the keel of the ship. Preceding the experiment divers were sent down to lash a Whitehead torpedo under the compartment, and the torpedo was fired from the Vernon by means of an electric circuit. No sooner was the torpedo exploded than—as seen from a distance of less than a mile—a spray that rose to an approximate height of 40 ft. was sent into the air and the ship immediately gave a heavy list to port. As a matter of fact, however, the force of the explosion had not only smashed the special compartment, but had blown the whole of the cellulose into the air, and, simultaneously, the concussion had so violently torn open the side of the ship that the water rushed in with considerable force. It had been determined in the event of the cellulose effectually plugging the breach to take the ship back to the dock yard for inspection, but so rapid was the heeling over that three tugs were employed in pushing the Belleisle towards the shore, where she sank in 20 ft. of water. As the damaged side of the vessel lies on the mud it will be impossible to discover the extent of the rent in her hull until she is raised, and as she is practically beached, some weeks may elapse before she returns to the dock yard. The rapidity with which the Belleisle sank is, however, conclusive evidence of the destructive power of the torpedo, while the instantaneous discharge of the cellulose into the air disproves the theory as to its plugging capacity.

Steamer and Tow Barge for Sale.

Lake steamer and tow for sale. Total tonnage 1,000 Equipment complete A-1 condition. Address, G. M., care Marine Review Pub. Co , 39-41 Wade Bldg., Cleveland, O. Oct. 15



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Wrought Iron Hook and Strap, Galvanized Iron Shells and Sheaves. Sheaves fitted with Genuine Star Metaline Bushings with Metaline Side Bearings.

These Blocks Save the Rope and Outwear all others.

Send for 1902 Catalogue M. A. R. FREE.

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A Guarantee of Quality.

Open Hearth Steel Castings of the Highest Grade for Locomotive, General Machinery and Shipbuilding Work.

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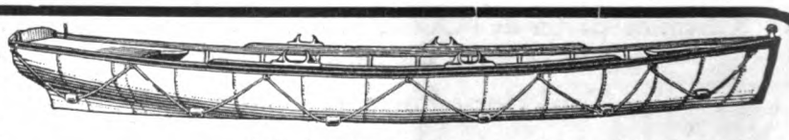

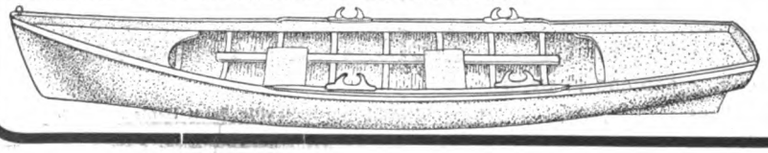

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THE ATLANTIC RECORD.

The smashing of the Atlantic record is always an interesting event. When the steamship Baltic of the old Collins Line crossed the Atlantic in 1852 in 9 days, 13 hours, and 42 minutes seagoing men spoke of her as a marvel of speed. It was but four years, though, before the old Cunarder Persia cut 12 hours, lacking 3 minutes, off this record. Yet the Persia's trip in these days is looked upon as made in cattle-boat time on the winter schedule, when the ships are not expected to make the passage at the speed to which they are forced in the summer. The record for fast trips across the Atlantic has been steadily lowered from year to vear since that time, though in later years the reduction has been in minutes instead of days and hours. When the Deutschland made her record westward passage the other day from Cherbourg in 5 days, 11 hours, 54 minutes, she clipped only 3 minutes from the record hitherto held by the Kronprinz Wilhelm. The Deutschland covered a distance of 3,054 miles on the passage. Her best day's run was 583 miles. The highest day's run ever made from Cherbourg was 601 miles, made by the Deutschland in August, 1901.

The old White Star liner Britannic, a record-breaker in her day, and one of the most remarkable vessels ever engaged in the North Atlantic trade, was recently sent to the scrap pile. She was sold to an Italian firm and is now being broken up at Bremen. She was built in 1874, and in 1876, soon after her launching, reduced the record held by the City of Berlin of the Inman Line, from 7 days, 18 hours, 2 minutes, to 7 days, 13 hours, 11 minutes. In the following year the Britannic set a new record of 7 days, 10 hours, 53 minutes. Using the same engines and boilers that were put into her when she was built, and which were never changed, the Britannic arrived in the Mersey on Sept. 4, 1900, on her 318th trip, in the record time of 7 days, 6 hours, 55 minutes, beating the time of her best previous passage made in 1888 of 7 days, 9 hours, 30 minutes.

While she was in commission the Britannic traveled 1,800,000 miles, and carried more than 200,000 passengers. It is only a comparatively short time since 6 days was considered remarkably fast time for the North Atlantic passage; now there are at least a dozen steamers which have made the trip in less time than that. The fastest time from Queenstown to New York was made by the Cunarder Lucania, which made the passage in 5 days, 7 hours, and 23 minutes in 1894. The distance is about 2,800 miles, showing that the steamship made an average speed of nearly 23 miles an hour for the whole distance.

Following is a list of steamships which have broken the records between New York and Queenstown since 1852. Previous to that date the Acadia of the Cunard Line held the supremacy, being the first vessel to make the trip in less than ten days:

Vessel and line.	Year.	D.	H.	M.
Baltic, Collins	1852	9	13	42
Persia, Cunard	1856	9	1	45
Scotia, Cunard	1863	8	2	48
City of Brussells, Inman	1869	7	22	3
Baltic, White Star	1873	7	20	9
City of Berlin, Inman	1875	7	18	2
Britannic, White Star	1876	7	13	11
Britannic, White Star	1877	7	10	53
Arizona, Guion	1879	7	8	11
Alaska, Guion	1882	6	22	..
America, National	1884	6	14	8
Oregon, Cunard	1884	6	9	42
Etruria, Cunard	1885	6	5	31
Umbria, Cunard	1887	6	4	42
Etruria, Cunard	1888	6	1	55
City of Paris, Inman	1889	5	23	38
City of Paris, Inman	1889	5	18	18
Teutonic, White Star	1891	5	16	31
City of Paris, Inman	1892	5	14	21
Campania, Cunard	1893	5	12	7
Lucania, Cunard	1894	5	7	23

The Army and Navy Register presents some surprising facts in its current issue in regard to rank in the civil engineer corps of the navy. The corps of civil engineers is responsible for property and expenditures amounting to over $100,000,000 and its officers have a greater length of service than in the other staff corps, yet they have much less rank than any other staff corps. Of thirty-one officers, twenty-one are junior lieutenants. These twenty-one will remain junior lieutenants to an average age of fifty-three years. Two of them will get no promotion till they are fifty-nine years of age. One of them will remain a junior lieutenant to the age of sixty-one years and eight months. The Register says that no such disheartening conditions exist in any other corps in the navy or army, but that fortunately the president can immediately rectify this gross injustice, as he his full authority by law to fix the rank of these officers.

Capt. Richardson Clover, recently relieved from duty as naval attache of the United States embassy at London, will be the first commander of the new battleship Ohio, which is being built by the Union Iron Works at San Francisco. The Ohio will go into commission next summer.

Two Steamers for Sale.

Steamers Russell Sage and John C. Gault, 1200 tons capacity, with complete fit-out for grain and package freight. Inland Lloyds rating A 2. Engines Steeple Compound, and two marine boilers in each boat in fair condition For particulars address A. W. Colton, Toledo, Ohio. Sept. 24

Steam Lighter for Sale.

Steam Lighter Jupiter—Length 68 ft., beam 20 ft., depth 6 ft.; tonnage 54 gross, 39 net; wood hull; built at Darien, Conn., in 1882. Steeple compound engine, cylinders 18 and 10 in., stroke 13 in.; built in 1886. Boiler allowed 106 lbs. pressure; built in 1887. Accommodations for pilot, engineer, fireman, two deck hands Apply to Treasurer, Fore River Ship & Engine Co., Quincy, Mass Sept. 24

$5,000 Buys Steamer Inter Ocean

Length 214 ft., beam 36 ft. Capacity 1600 tons. Steeple-compound engine. Boiler allowed 110 lbs. steam. Address C. S. Mahonev, 17 Main St., Buffalo, N. Y. tf

Schooner for Sale.

For Sale—Schooner Howlett, 127 ft. long, 29 ft. beam; carries 200,000 ft. of lumber. Outfit nearly all new. Boat in good condition. Enquire McCracken Bros., Muskegon, Mich Oct. 15

WHITE OAK
TIMBERS, PLANK
AND
DIMENSION STOCK
F. S. SHURICK,
18 Broadway, NEW YORK CITY

Tug for Sale.

Tug Warwick—Engine 15x17. Boiler allowed 110 lbs. steam. Both in first-condition. Hull practically new. Boat inspected and ready to run. Cheap for cash. Can be seen at Toledo, O. Apply to James Rooney, 1118 Collingwood ave, Toledo, O. t f

Boiler For Sale.

For sale cheap. Scotch marine boiler 10 ft. by 78 in. triple riveted, 5/8 steel plate, dome 6 ft. by 24 in., 98 three inch tubes, stays 5/8 center; allowed 168 lbs steam pressure. Boiler is now working and is as good as new. Address I. Applebaum, Detroit, Mich. tf

Wanted to Buy.

Two large flat scows in first-class condition. Hugo & Tims, Duluth, Minn. Oct. 1

Wanted—Hydraulic Steering Gear.

Good second hand gear suitable for a tug. Give price, description and where situated. H. M. Loud's Sons Co., Au Sable, Mich. Sept. 24

Steam Yacht Wanted.

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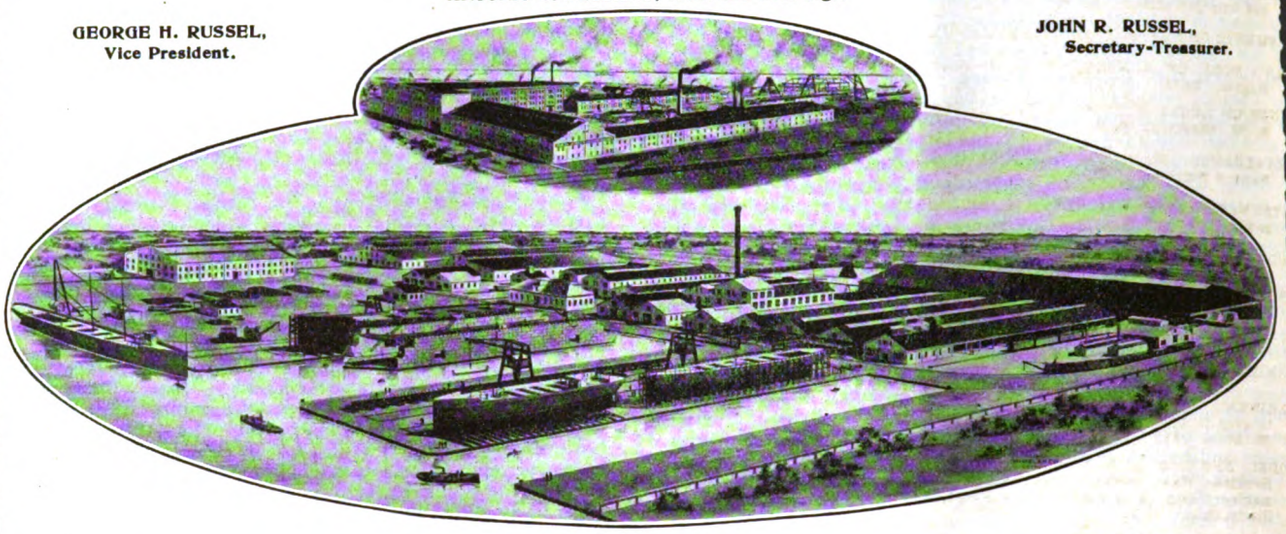

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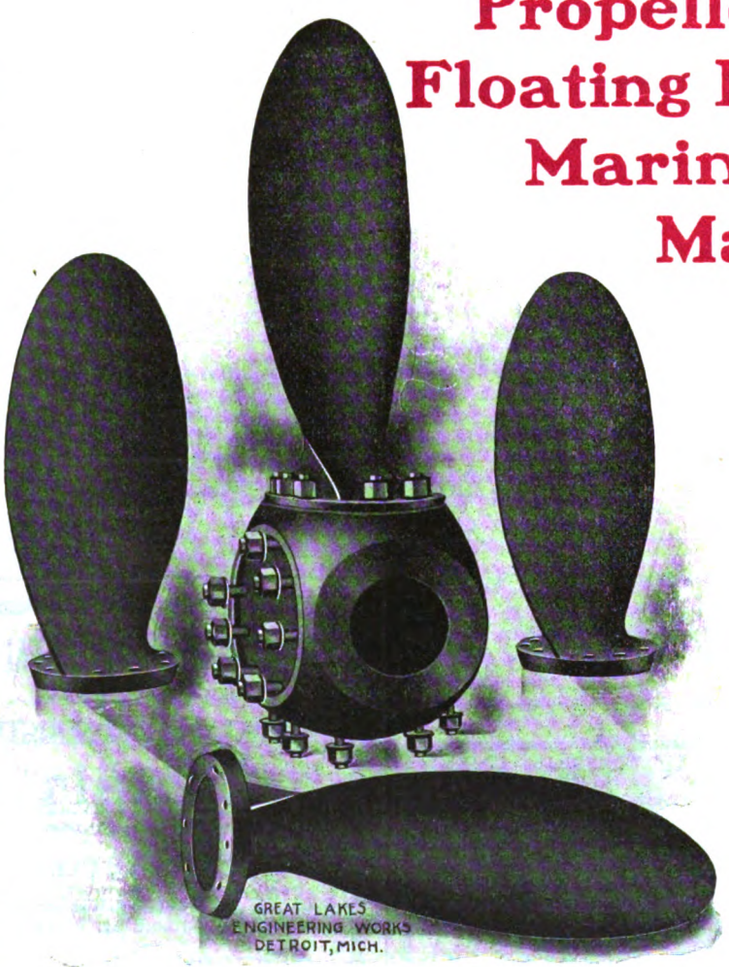

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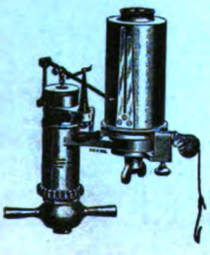

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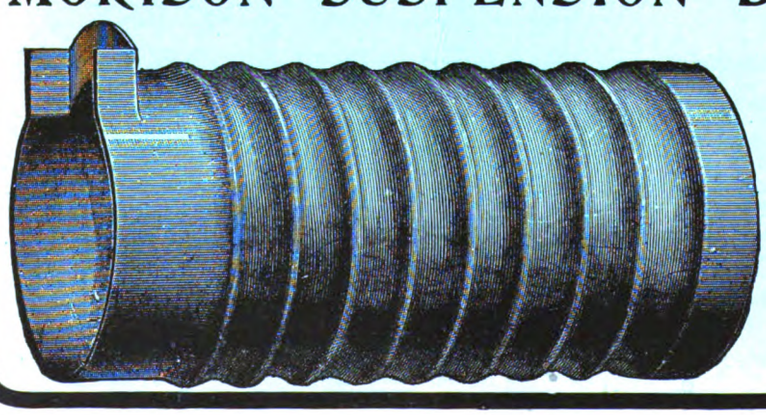

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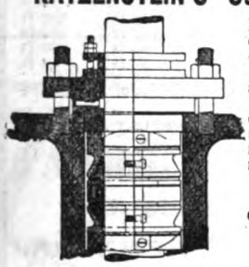

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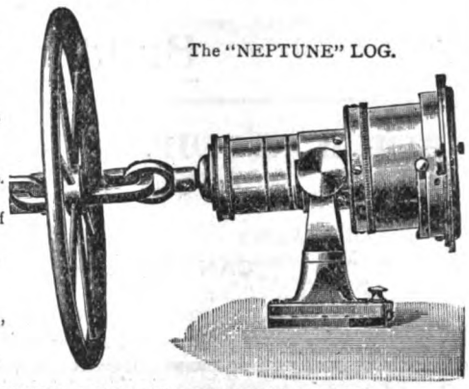

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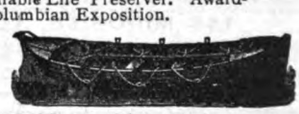

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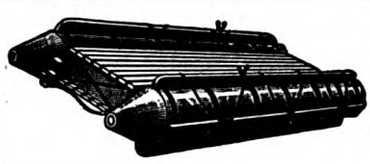

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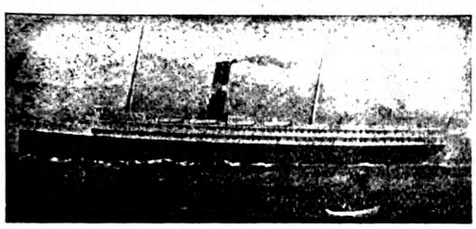

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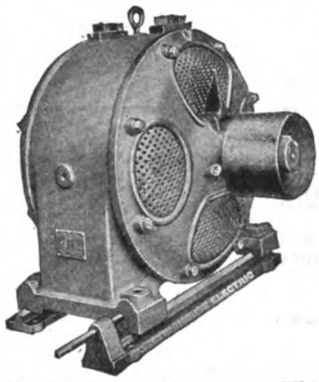

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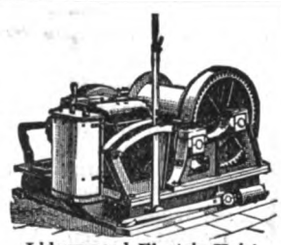

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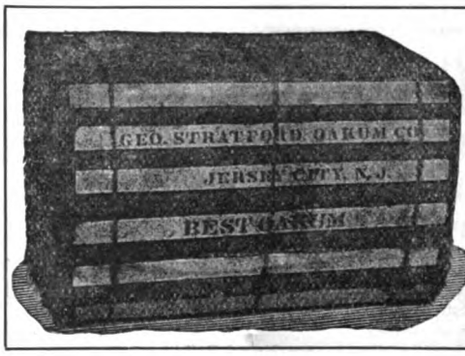

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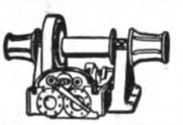

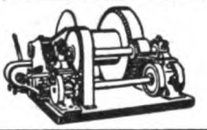

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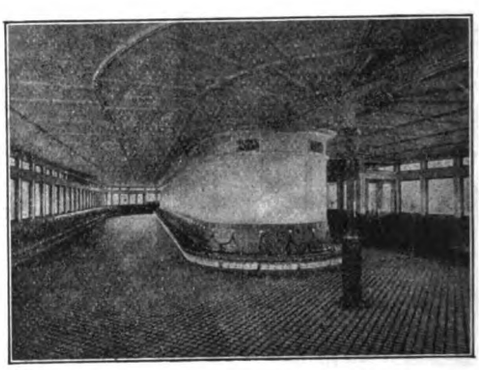

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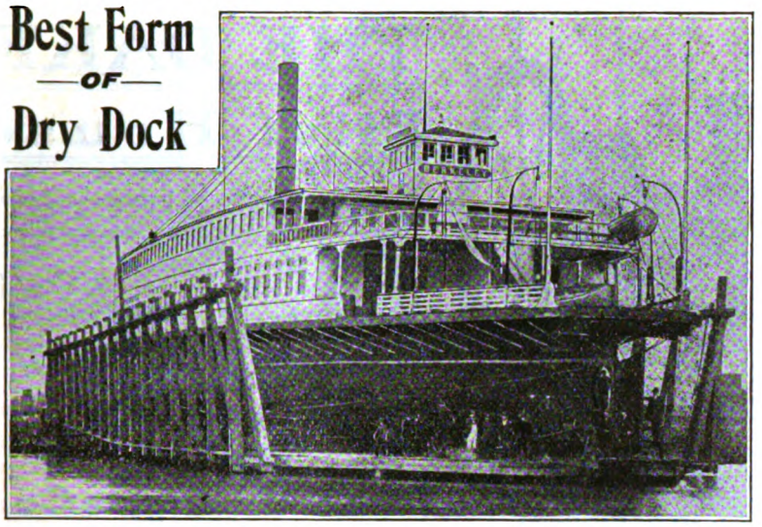

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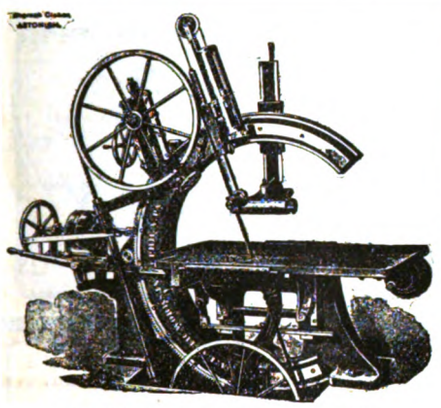

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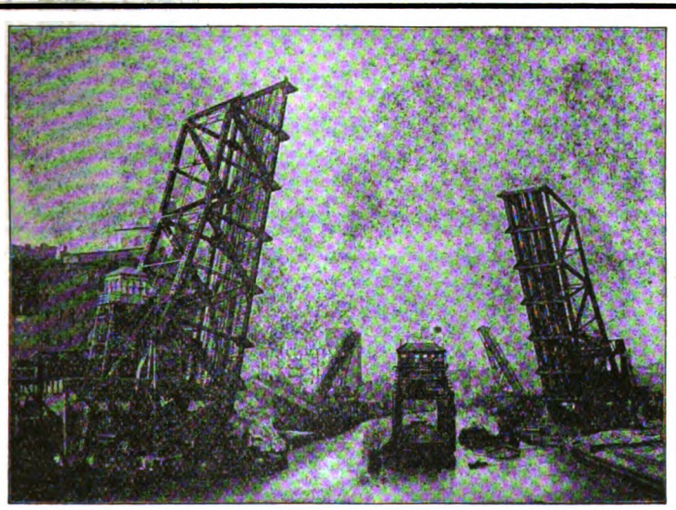

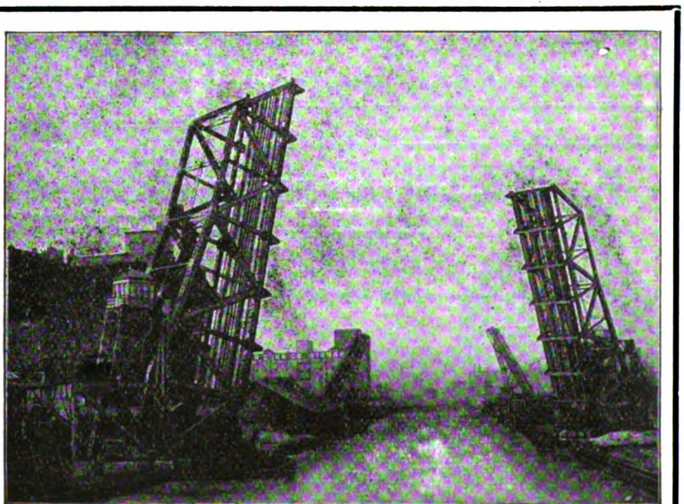

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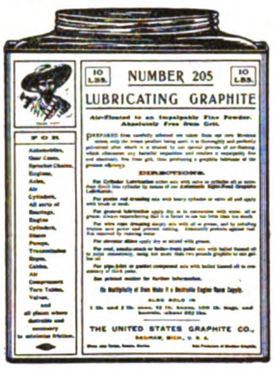

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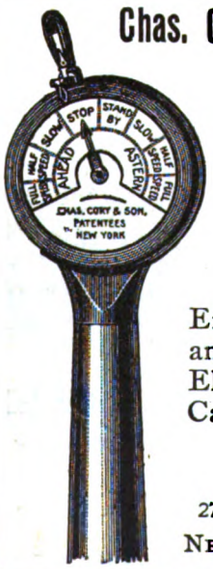

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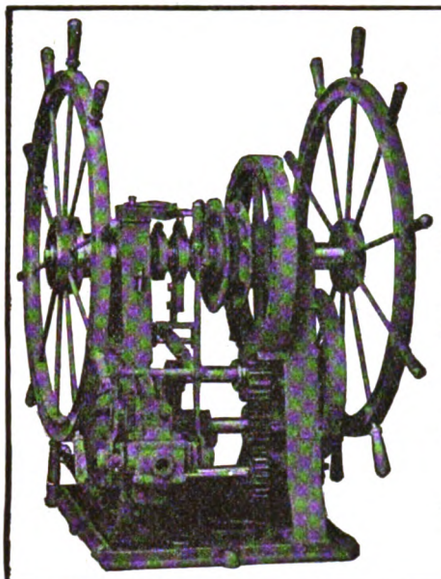

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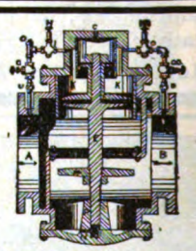

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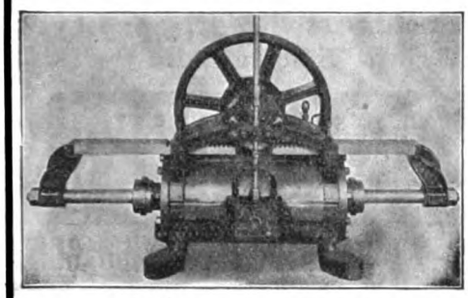

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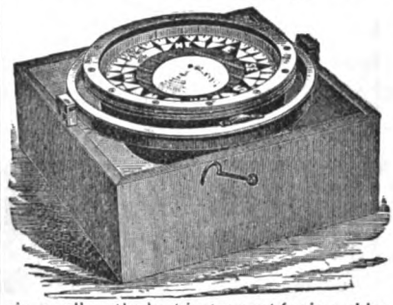

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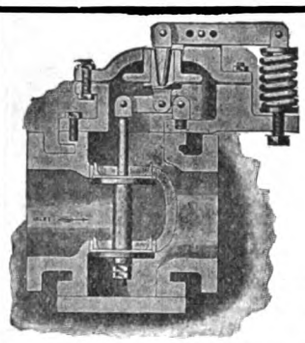

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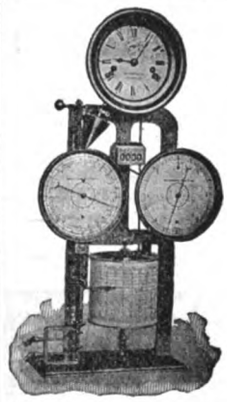

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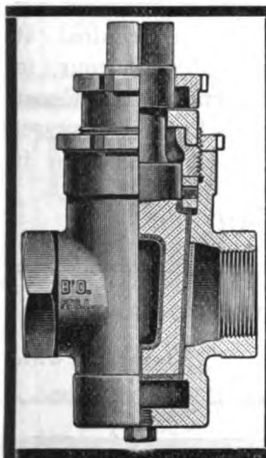

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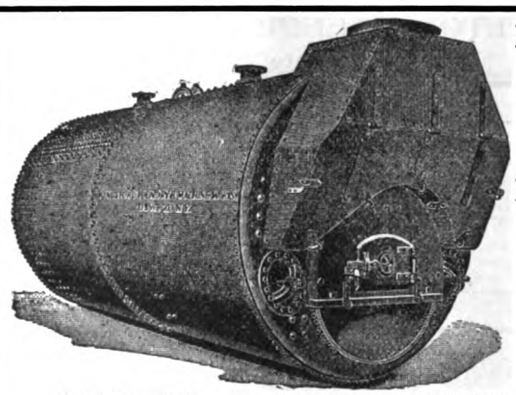

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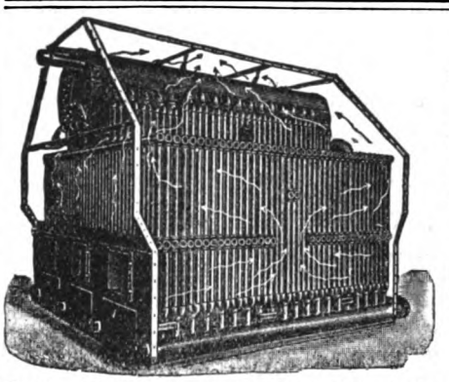

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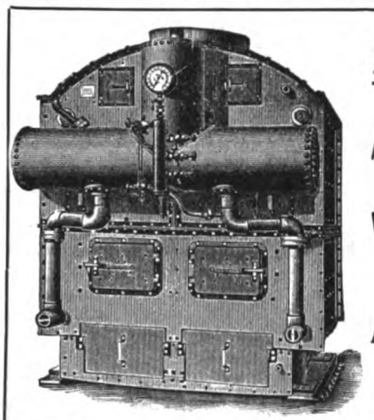

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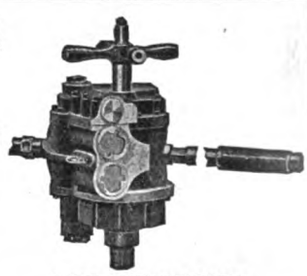

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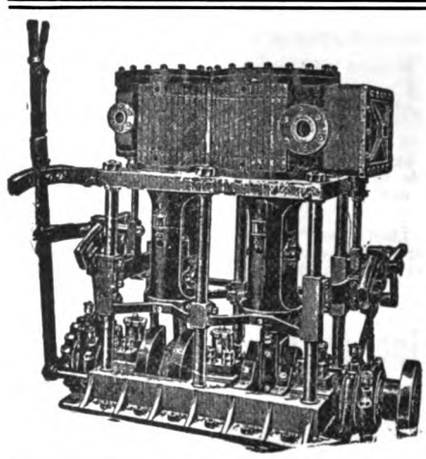

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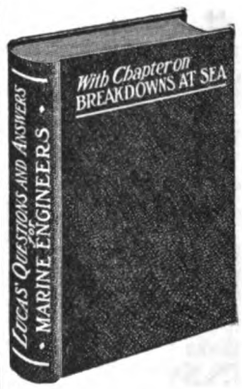

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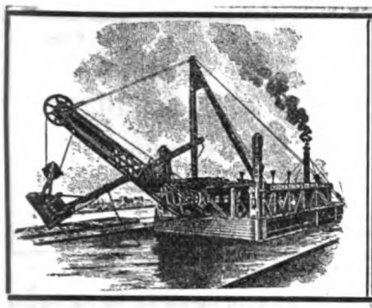

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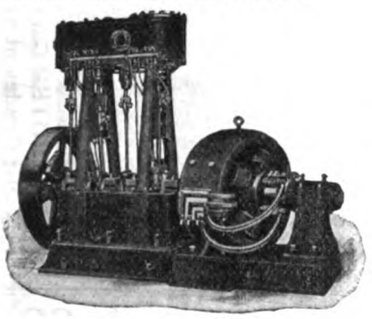

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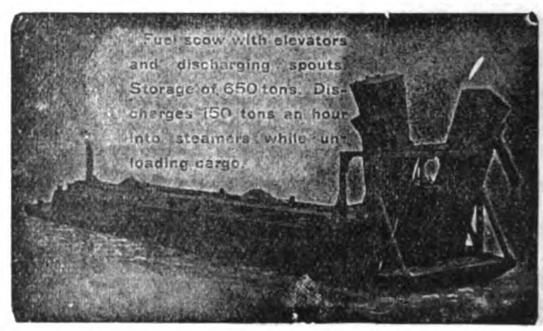
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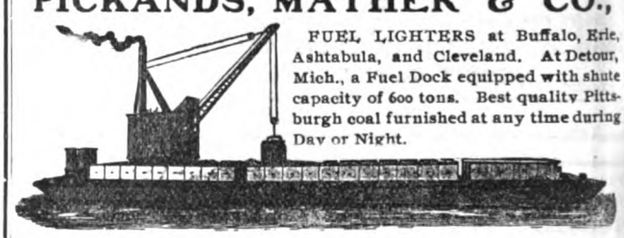

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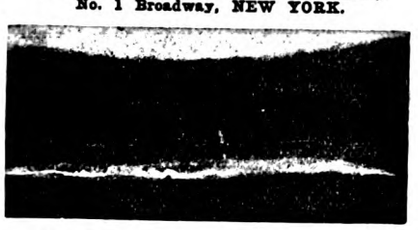

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Nightfall on the River.
A Lumber Tow.

SAULT STE. MARIE, MICH.
General View of Locks from Offices.
Poe Lock, from below, closed.
Poe Lock, from below, open.
Poe Lock, from above.
Poe Lock, with Whaleback.
Weitzel Lock, from above.
Weitzel Lock, from below.
Str. North-Land Passing Locks, two views.
Upper Entrance to Lock Canal.
Gate Mechanism.
Interior of Power House.
Canadian Lock from Upper End.
Canadian Lock from Lower End.
The Rapids, looking up.
The Rapids, looking across.
Indians fishing in the rapids.

PANORAMIC VIEWS.—7x17 inches at $1.75 each.
Lackawanna Ore Docks—Unloading ore.
American Steel & Wire Co.'s Plant, Cleveland.
Ore Docks and Harbor, Cleveland.
Ore Docks, Cleveland.
Water Front, Detroit, from Windsor.
Coal and Ore Docks at Oswego.

Address; MARINE REVIEW PUB. CO.,
39-41 Wade Bldg., Cleveland, Ohio.

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BUYERS' DIRECTORY OF THE MARINE TRADE.

For a more complete classification than that represented by advertisers in the Marine Review and Marine Record, see the BLUE BOOK OF AMERICAN SHIPPING, marine and naval directory of the United States, published by the Marine Review Pub. Co., 39-41 Wade Bldg., Cleveland.

See accompanying Index of Advertisers for full addresses of concerns in this directory.

AIR COMPRESSORS, AIR HOISTS, ETC.

Chicago Pneumatic Tool Co.....Chicago
Dake Engine Co .....Grand Haven, Mich.
"Long Arm" System Co.....Cleveland.

AIR PUMPS AND APPLIANCES

Fore River Ship & Engine Co.....Quincy, Mass.

ANCHORS.

Beldt Anchor Co.....Chester, Pa.
Bowers, L. M. & Co.....Binghamton, N. Y.
DeGrauw, Aymar & Co.....New York.
Seaboard Steel Casting Co.....Chester, Pa.

ANTI-FRICTION METALS.

Cramp, Wm. & Sons.....Philadelphia.
Hardy, Wm. A.....Fitchburg, Mass.
Phosphor Bronze Smelting Co., Ltd....Philadelphia.
Pittsburg White Metal Co.....Pittsburg, Pa.

ARTIFICIAL DRAFT FOR BOILEDS.

American Ship Building Co.....Cleveland.
Bloomsburg & Co., H.....Newport News, Va.
Detroit Shipbuilding Co.....Detroit.
Great Lakes Engineering Works.....Detroit.
Sturtevant, B. F. Co.....Boston.

ATTORNEYS AND PROCTORS IN ADMIRALTY.

Brown, Harvey L.....Buffalo.
Faust, Lieut., Wm. H. .....Buffalo.
Gilchrist, Albert J.....Cleveland.
Goulder, Holding & Masten.....Cleveland.
Hoyt, Dustin & Kelley.....Cleveland.
Kremer, C. E.....Chicago.
MacDonald, Ray G.....Chicago.
Pinney & Warner.....Cleveland.
Shaw, Warren, Cady & Oakes.....Detroit.
Spencer, H. R.....Duluth.
White, Johnson, McCaslin & Cannon.....Cleveland.

BANKERS.

Fahey & Co.....Cleveland.
Federal Trust Co.....Cleveland.
Cleveland Trust Co.....Cleveland.

BAROMETERS, MARINE GLASSES, ETC.

Bliss, John & Co.....New York.
Ritchie, E. S. & Sons.....Brookline, Mass.

BELTING, RUBBER.

New York Belting & Packing Co.....New York.

BLOCKS, SHEAVES, ETC.

Boston & Lockport Block Co.....Boston, Mass.
Cleveland Block Co.....Cleveland.

BLOWERS.

Sturtevant, B. F. Co.....Boston.

BOAT BUILDERS.

Dreln, Thos. & Son.....Wilmington, Del.
Kahnweiler's Sons, David.....New York.
Lane & DeGroot.....Long Island City, N. Y.
Marine Construction & D. D. Co., ...
.....Mariner's Harbor, S. I., N. Y.
Rippley Hardware Co.....Grafton, Ill.
Truscott Boat Mfg. Co.....St. Joseph, Mich.
Warrington Iron Works.....Chicago.
Willard, Chas. P. & Co.....Chicago.

BOILER MANUFACTURERS.

Almy Water Tube Boiler Co.....Providence, R. I.
American Ship Building Co.....Cleveland.
Atlantic Works.....East Boston, Mass.
Babcock & Wilcox Co.....New York.
Bath Iron Works, Ltd.....Bath, Me.
Boyer's Sons, L. .....New York.
Chicago Ship Building Co.....Chicago.
Clyde Machine Works.....Chicago.
Cramp, Wm. & Sons.....Philadelphia.
Crescent Ship Yard Co.....Elizabethport, N. J.
Delauney Belleville & Co.....St. Denis, France.
Detroit Ship Building Co.....Detroit.
Fletcher, W. & A. Co.....Hoboken, N. J.
Fore River Ship & Engine Co.....Quincy, Mass.
Forest City Boiler Co.....Cleveland.
Great Lakes Engineering Works .....Detroit
Jenks Ship Building Co.....Port Huron, Mich.
Kingsford Foundry & Machine Works Oswego, N. Y.
Maryland Steel Co.....Sparrow's Point, Md.
Milwaukee Dry Dock Co.....Milwaukee.
Moran Bros. Co.....Seattle, Wash.
Mosher, Chas. D.....New York.
Neafie & Levy Ship & Engine Building Co....Phila.
Newport News Ship Building Co Newport News, Va.
Risdon Iron Works.....San Francisco.
Roberts Safety Water Tube Boiler Co..New York.
Stirling, The Co.....Chicago.
Superior Ship Building Co.....Superior, Wis.
Taylor Water Tube Boiler Co.....Detroit.
Union Machine & Boiler Co.....Cleveland.
United States Ship Building Co.....New York.
Warrington Iron Works.....Chicago.
Willard, Chas. P. & Co.....Chicago.

BOILER COMPOUNDS.

Dearborn Drug & Chemical Works.....Chicago.

BOILER RIVETS.

Bourne-Fuller Co. .....Cleveland.

BOILER STAYBOLTS, IRON OR STEEL, HOLLOW OR SOLID.

Falls Hollow Staybolt Co.....Cuyahoga Falls, O.

BOOKS, NAUTICAL AND ENGINEERING.

Audel & Co., Theo.....New York.
Marine Review Pub. Co.....Cleveland.

BRASS AND BRONZE CASTINGS.

Cramp, Wm. & Sons.....Philadelphia.
Fore River Ship & Engine Co.....Quincy, Mass.
Great Lakes Engineering Works..... Detroit.
Lunkenheimer Co.....Cincinnati.
Macbeth Iron Co.....Cleveland.
Phosphor Bronze Smelting Co.....Philadelphia.

BRASS—SHEET, ROD, ETC.

Waterbury Brass Co.....New York.

BRIDGES, BUILDERS OF

Scherzer Rolling Lift Bridge Co.....Chicago.

BUCKETS, ORE AND COAL.

Bartlett & Snow Co., C. O. .....Cleveland.
Brown Hoisting & Conveying Machine Co. Cleveland.
Wellman-Seaver-Morgan Co. .....Cleveland.

CABIN AND CABINET FINISHING WOODS.

Martin-Barriss Co. .....Cleveland.

CAPSTANS.

American Ship Windlass Co.....Providence, R. I.
Hyde Windlass Co. .....Bath, Me.

CEMENT, IRON FOR REPAIRING LEAKS.

Smooth-On Mfg. Co. .....Jersey City, N. J.

CHAINS.

Standard Chain Co. .....Pittsburg.

CHAIN HOISTS.

Boston & Lockport Block Co. .....Boston, Mass.
Dake Engine Co. .....Grand Haven, Mich.

CHARTS.

Marine Review Pub. Co. .....Cleveland.
Potter, J. D.....London.

CIRCULATOR, EQUILIBRIUM.

With Steam Heating Attachment.
Bloomsburg & Co., H. .....Baltimore, Md.

CLOCKS (Maine), CHRONOMETERS, BELLS.

Ashton Valve Co.....Boston.
Bliss, John & Co.....New York.
Chelsea Clock Co.....Boston.
Ritchie, E. S. & Sons.....Brookline, Mass.

COAL PRODUCERS AND SHIPPERS.

Hanna, M. A. & Co.....Cleveland.
Pickands, Mather & Co.....Cleveland.
Pittsburg Coal Co.....Cleveland.
Rochester & Pittsburg Coal & Iron Co.....Buffalo.

COAL AND ORE HANDLING MACHINERY.

Bartlett & Snow Co., C. O. .....Cleveland.
Brown Hoisting Machinery Co., (Inc.)....Cleveland.
Lidgerwood Mfg. Co.....New York.
Wellman-Seaver-Morgan Co.....Cleveland.

COMPASSES.

Bliss, John & Co.....New York.
Ritchie, E. S. & Sons.....Brookline, Mass.

COMPASS ADJUSTER.

Smith, Capt. W. J.. .....Seattle, Wash.

CONDENSERS.

Thropp & Sons Co., John E.....Trenton, N. J.

CONTRACTORS FOR PUBLIC WORKS.

Buffalo Dredging Co.....Buffalo.
Chicago & Gt. Lakes Dredge & Dock Co...Chicago.
Lake Erie Dredging Co.....Buffalo.
Smith Co., L. P. & J. A. .....Cleveland.

COPPER, TIN AND SHEET IRON WORK.

McCutcheon, C. H.....Buffalo.
Rippley Hardware Co.....Grafton, Ill.

COPPER—SHEET, TUBES AND ROD.

Waterbury Brass Co.....New York.

CORDAGE

Baker & Co., H. H.....Buffalo.
DeGrauw, Aymar & Co.....New York.
Upson-Walton Co.....Cleveland.

CORK JACKETS AND RINGS.

Armstrong Cork Co.....Pittsburg Pa.
Kahnweiler's Sons, D.....New York.
Lane & DeGroot .....Long Island City, N. Y.

CHAIN CONVEYORS, HOISTS.

Bartlett & Snow Co., C. O. .....Cleveland.
Brown Hoisting Machinery Co., (Inc.)....Cleveland.
Chicago Pneumatic Tool Co.....Chicago.
General Electric Co.....Schenectady, N. Y.
Lidgerwood Mfg. Co.....New York.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

DEAD-LIGHTS, AIR-PORTS, ETC.

"Long-Arm" System Co. .....Cleveland.

DISTANCE FINDER.

Nicholson Ship Log Co.....Cleveland, O.

DIVING APPARATUS.

Morse, A. J. & Son.....Boston.
Schrader's Son, A.....New York.

DOORS, WATER TIGHT, ETC.

"Long-Arm" System Co. .....Cleveland.

DRAWING MATERIALS.

Schwencke, Kirk & Co.....New York.

DREDGING CONTRACTORS.

Buffalo Dredging Co.....Buffalo.
Chicago & Gt. Lakes Dredge & Dock Co...Chicago.
Lake Erie Dredging Co.....Buffalo.
Smith Co., L. P. & J. A. .....Cleveland.

DRILLS

Chicago Pneumatic Tool Co.....Chicago.

DRYING APPARATUS.

Sturtevant, B. F. Co.....Boston.

DRY DOCKS.

American Ship Building Co.....Cleveland.
Atlantic Works.....East Boston, Mass.
Bath Iron Works, Ltd.....Bath, Me.
Buffalo Dry Dock Co.....Buffalo.
Chicago Ship Building Co.....Chicago.
Craig Ship Building Co.....Toledo, O.
Cramp, Wm. & Sons.....Philadelphia.
Crescent Ship Yard Co.....Elizabethport, N. J.
Detroit Ship Building Co.....Detroit.
Great Lakes Engineering Works .....Detroit.
Lockwood Mfg. Co.....East Boston, Mass.
Manitowoc Dry Dock Co.....Manitowoc, Wis.
Marine Construction & Dry Dock Co.....New York.
Maryland Steel Co.....Sparrow's Point, Md.
Milwaukee Dry Dock Co.....Milwaukee.
Moran Bros. Co.....Seattle, Wash.
Newport News Ship Building Co Newport News, Va.
Shipowners Dry Dock Co.....Chicago.
Superior Ship Building Co.....Superior, Wis.
United States Ship Building Co.....New York.

ELECTRIC HOISTS AND CRANES.

Elwell-Parker Electric Co.....Cleveland.
General Electric Co.....Schenectady, N. Y.
Lidgerwood Mfg. Co.....New York.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

ELECTRIC LIGHT AND POWER PLANTS.

Electro-Dynamic Co.....Philadelphia.
Elwell-Parker Electric Co.....Cleveland.
General Electric Co.....Schenectady, N. Y.
Sturtevant, B. F. Co.....Boston.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

ELECTRIC STEERING GEAR, SPEED AND RUDDER INDICATORS, ETC.

Electro-Dynamic Co.....Philadelphia

ENGINE BUILDERS, MARINE.

American Ship Building Co.....Cleveland
Atlantic Works.....East Boston, Mass
Bath Iron Works, Ltd.....Bath, Me
Buffalo Forge Co.....Buffalo
Chicago Ship Building Co.....Chicago
Chase Machine Co.....Cleveland
Craig Ship Building Co.....Toledo, O.
Cramp, Wm. & Sons.....Philadelphia
Crescent Ship Yard Co.....Elizabethport, N. J.
Dake Engine Co. .....Grand Haven, Mich
Detroit Ship Building Co.....Detroit

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BUYERS' DIRECTORY OF THE MARINE TRADE.—Continued.

ENGINE BUILDERS, MARINE.—Continued.

Fletcher, W. & A. Co.....Hoboken, N. J.
Fore River Ship & Engine Co.....Quincy, Mass.
Great Lakes Engineering Works.....Detroit, Mich.
Hall Bros. .....Philadelphia.
Jenks Ship Building Co.....Port Huron, Mich.
Lockwood Mfg. Co.....East Boston, Mass.
Macbeth Iron Co.....Cleveland.
Maryland Steel Co.....Sparrow's Point, Md.
Milwaukee Dry Dock Co.....Milwaukee.
Moran Bros. Co.....Seattle, Wash.
Mosher, Chas. D.....New York.
Moulton Steering Engine Co.....New York.
Neafie & Levy Ship & Engine Building Co....Phila.
Newport News Ship Building Co Newport News, Va.
Risdon Iron Works.....San Francisco.
Roach's Ship Yard.....Chester, Pa.
Sheriffs Mfg. Co.....Milwaukee.
Superior Ship Building Co.....Superior, Wis.
Thropp, J. E. & Sons Co.....Trenton, N. J.
Trout, H. G. .....Buffalo.
United States Ship Building Co.....New York.
Warrington Iron Works.....Chicago.
Willard, Chas. P. & Co.....Chicago.

ENGINE ROOM TELEGRAPH, CALL BELLS, ETC.

Cory, Chas. & Son.....New York.
Electro-Dynamic Co.....Philadelphia.
MacLean Hydraulic Signal Co.....Chicago.

ENGINEERING SPECIALTIES AND SUPPLIES.

Crane Co. .....Chicago.
Farnan Brass Works.....Cleveland.
Kieley & Mueller.....New York.
Lunkenheimer Co.....Cincinnati.
McCutcheon, C. H. .....Buffalo.
New York Belting & Packing Co.....New York.
Reilly Repair & Supply Co., James....New York.
Rippley Hardware Co ..... Grafton, Ill.

ENGINEERS, MARINE, MECHANICAL, CONSULTING.

Electro-Dynamic Co.....Philadelphia.
Garrett-Cromwell Engineering Co.....Cleveland.
Gaskin, Edward .....Buffalo.
Hunt, Robt. W. & Co.....Chicago.
Kidd, Joseph .....Duluth, Minn.
Logan, Robert .....Cleveland.
Matteson & Drake.... ..... Philadelphia.
Mosher, Chas. D.....New York.
Newman, R. L. .....New York.
Pittsburg Testing Laboratory, Ltd.....Pittsburg.
Powell, Ambrose V.....Chicago.
Roelker, H. B. .....New York.
Sadler, Perkins & Field .....New York.
Wood, W. J. .....Chicago.

EVAPORATING AND DISTILLING APPARATUS.

Reilly Repair & Supply Co., James....New York.

FANS FOR VENTILATION, EXHAUST, ETC.

Sturtevant, B. F. Co.....Boston.

FEED WATER PURIFIERS AND HEATERS.

Learmonth, Robert.....Buffalo.
Reilly Repair & Supply Co., James....New York.
Ross Valve Co.....Troy, N. Y.

FIXTURES FOR LAMPS, OIL OR ELECTRIC.

General Electric Co.....Schenectady, N. Y.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

FORGES.

Sturtevant, B. F. Co.....Boston.

FORGINGS FOR CRANK, PROPELLER OR THRUST SHAFTS, ETC.

Cleveland City Forge & Iron Co.....Cleveland.
Fore River Ship & Engine Co.....Quincy, Mass
Macbeth Iron Co.....Cleveland.

FLUE WELDING.

Fix's, S. Sons .....Cleveland.

FURNACES FOR BOILERS.

Continental Iron Works.....New York

FUELING COMPANIES AND COAL DEALERS.

Hanna, M. A. & Co.....Cleveland.
Ironville Dock & Coal Co. ..... Toledo, O.
Pickands, Mather & Co.....Cleveland.
Pittsburg Coal Co.....Cleveland.
Rochester & Pittsburg Coal & Iron Co.....Buffalo.
Smith, Stanley B. & Co.....Detroit.
Smith Coal & Dock Co., Stanley B.....Toledo, O.
Youghiogheny & Lehigh Valley Coal Co....Chicago.

GASKETS, RUBBER.

New York Belting & Packing Co.....New York.

GAS BUOYS.

Safety Car Heating & Lighting Co.....New York

GAS AND GASOLINE ENGINES.

Chase Machine Co.....Cleveland.

GAUGES, STEAM AND VACUUM.

American Steam Gauge Co.....Boston.
Ashton Valve Co.....Boston.
Lunkenheimer Co.....Cincinnati.

GRAPHITE.

Dixon Crucible Co., Joseph.....Jersey City, N. J.
United States Graphite Co .....Saginaw, Mich.

HAMMERS, PNEUMATIC.

Chicago Pneumatic Tool Co..... Chicago.

HAMMERS, STEAM.

Chase Machine Co.....Cleveland.

HATCH GEARS.

"Long-Arm" System Co. .....Cleveland.

HEATING APPARATUS.

Sturtevant, B. F. Co.....Boston.

HOISTS FOR CARGO, ETC.

American Ship Building Co.....Cleveland.
Brown Hoisting Machinery Co., (Inc.)....Cleveland.
Chase Machine Co.....Cleveland.
Elwell-Parker Electric Co.....Cleveland.
General Electric Co. .....New York.
Hyde Windlass Co.....Bath, Me.
Lidgerwood Mfg. Co.....New York.
Marine Iron Co.....Bay City, Mich.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

HOLLOW STAYBOLT IRON.

Falls Hollow Staybolt Co.....Cuyahoga Falls, O.

HOSE FITTINGS.

Farnan Brass Works.....Cleveland.

HOSE, RUBBER.

New York Belting & Packing Co.....New York.

HYDRAULIC DREDGES.

Great Lakes Engineering Works ..... Detroit.

HYDRAULIC TOOLS.

Watson-Stillman Co., The.....New York.

ICE MACHINERY.

American Linde Refrigerating Co.....New York.
Roelker, H. B. .....New York.

INDICATORS FOR STEAM ENGINES.

American Steam Gauge Co.....Boston.
Ashton Valve Co.....Boston.

INJECTORS.

American Injector Co.....Detroit.
Crane Co.....Chicago.
Jenkins Bros. .....New York.
Lunkenheimer Co.....Cincinnati.
Penberthy Injector Co. .....Detroit, Mich.

INSURANCE, MARINE.

Brown & Co. .....Buffalo.
Elphicke, C. W. & Co.....Chicago.
Fleming & Co., P. H. .....Chicago.
Hawgood & Co., W. A. .....Cleveland.
Helm & Co., D. T. .....Duluth.
Hutchinson & Co. .....Cleveland.
McCarthy, T. R. .....Montreal.
McCurdy, Geo. L. .....Chicago.
Mitchell & Co. ..... Cleveland.
Peck, Chas. E. & W. F. ..New York and Chicago.
Richardson, W. C. ..... Cleveland.
Sullivan, D. & Co.....Chicago.
Weeks, F. H. ..... New York.

IRON ORE AND PIG IRON.

Bourne-Fuller Co. .....Cleveland.
Hanna, M. A. & Co.....Cleveland.
Pickands, Mather & Co.....Cleveland.

LAUNCHES—STEAM, NAPHTHA, ELECTRIC.

Marine Construction & D. D. Co.....
.....Mariner's Harbor, S. I., N. Y.
Truscott Boat Mfg. Co.....St. Joseph, Mich.
Warrington Iron Works.....Chicago.
Willard, Chas. P. .....Chicago.

LIFE FLOATS.

Carley Life Float Co. .....New York.

LIFE PRESERVERS, LIFE BOATS, BUOYS.

Armstrong Cork Co. .....Pittsburg.
Carley Life Float Co..... New York
Drein, Thos. & Son .....Wilmington, Del.
Kahnweiler's Sons, D. .....New York.
Lane & DeGroot .....Long Island City, N. Y.
Marine Construction & Dry Dock Co.....
.....Mariner's Harbor, S. I., N. Y.
Rippley Hardware Co ..... Grafton, Ill.

LIGHTS, SIDE AND SIGNAL.

Helvig, H. A. J. .....New York.
Russell & Watson .....Buffalo.

LOGS.

Bliss, John & Co..... New York.
Nicholson Ship Log Co. .....Cleveland.
Walker & Sons, Thomas .....Birmingham, Eng.
Also Ship Chandlers.

LUBRICATING GRAPHITE.

Dixon Crucible Co., Joseph..... Jersey City, N. J.
United States Graphite Co ..... Saginaw, Mich.

LUMBER.

Martin-Barriss Co. .....Cleveland.
Moran Bros. Co.....Seattle, Wash.
Shurick, F. S. .....New York.

MACHINISTS.

Chase Machine Co.....Cleveland.
Lockwood Mfg Co .....East Boston, Mass.
Macbeth Iron Co.....Cleveland.
Union Machine & Boiler Co. .....Cleveland.

MACHINE TOOLS (WOOD WORKING).

Atlantic Works, Inc. .....Philadelphia.

MAN-HOLES, SWING DOORS, ETC.

"Long-Arm" System Co. .....Cleveland.

MARINE RAILWAYS, BUILDERS OF

Crandall & Son, H. I. .....East Boston, Mass.

MATTRESSES, CUSHIONS, BEDDING.

Fogg, M. W. .....New York.

MECHANICAL DRAFT FOR BOILERS.

American Ship Building Co.....Cleveland.
Bloomsburg & Co., H. .....Baltimore, Md.
Detroit Ship Building Co.....Detroit.
Sturtevant, B. F. Co.....Boston.

METALLIC PACKING.

Hayden Mfg. Co., N. L. .....Columbus, O.
Katzenstein, L. & Co. .....New York.
U. S. Metallic Packing Co. .....Philadelphia.

METAL POLISH.

Bertram's Oil Polish Co.....Boston.

MOTORS, GENERATORS—ELECTRIC.

Electro-Dynamic Co.....Philadelphia.
Elwell-Parker Electric Co.....Cleveland.
General Electric Co.....Schenectady, N. Y.
"Long-Arm" System Co. .....Cleveland.
Sturtevant, B. F. Co.....Boston
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

NAUTICAL INSTRUMENTS.

Bliss, John & Co. .....New York.
Ritchie, E. S. & Sons .....Brookline, Mass.

NAUTICAL SCHOOLS.

Chicago Nautical School. ..... Chicago.
Seattle Nautical School .....Seattle, Wash.

NAVAL ARCHITECTS.

Gaskin, Edward .....Buffalo.
Kidd, Joseph ..... Duluth, Minn.
Logan, Robert ..... Cleveland.
Matteson & Drake..... .....Philadelphia.
Mosher, Chas. D.....New York.
Newman, R. L. ..... New York.
Sadler, Perkins & Field .....New York.
Wood, W. J. .....Chicago.

OAKUM.

DeGrauw, Aymar & Co. .....New York.
Stratford Oakum Co. .....Jersey City, N. J.

OIL FOR PAINTING.

Sipe & Co., James B .....Allegheny, Pa.

OILS AND LUBRICANTS.

Dixon Crucible Co., Joseph .....Jersey City, N. J.
Standard Oil Co. .....Cleveland.
United States Graphite Co ..... Saginaw, Mich.

PACKING.

Crane Co. .....Chicago.
Hayden Mfg. Co., N. L. .....Columbus, O.
Jenkins Bros. .....New York.
Katzenstein, L. & Co. .....New York.
New York Belting & Packing Co. .....New York.
United States Metallic Packing Co...Philadelphia.

PAINTS.

Baker, Howard H. & Co.....Buffalo.
Berry Bros., Ltd. .....Detroit.
Detroit Varnish Co. ..... Detroit.
Detroit White Lead Works ..... Detroit.
Mohawk Paint & Chemical Co.....Norwich, Conn.
New Jersey Zinc Co. ..... New York.
Sipe & Co., James B..... Allegheny, Pa.
United States Graphite Co..... Saginaw, Mich.
Upson-Walton Co. .....Cleveland.

PATENT ATTORNEYS.

Thurston & Bates .....Cleveland.

PATTERN SHOP MACHINERY.

Atlantic Works, Inc. .....Philadelphia.

PIPE—BRASS AND COPPER, IRON PIPE SIZE.

Waterbury Brass Co. .....New York.

PIPE-JOINT COMPOUND.

United States Graphite Co..... Saginaw, Mich.

PIPE, WROUGHT IRON.

Bourne-Fuller Co. .....Cleveland.
Crane Co. .....Chicago.
Macbeth Iron Co.....Cleveland.

PLANING MILL MACHINERY.

Atlantic Works, Inc. .....Philadelphia.

PLATES—SHIP, STRUCTURAL, ETC.

Bourne-Fuller Co..... Cleveland.

PLUMBING, MARINE.

Reilly Repair & Supply Co., James....New York.
Sands, Alfred B. & Son.....New York.

PNEUMATIC TOOLS.

Allen, John F. .....New York.
Chicago Pneumatic Tool Co. .....Chicago.

POLISH FOR METALS.

Bertram's Oil Polish Co.....Boston.

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BUYERS' DIRECTORY OF THE MARINE TRADE.—Continued.

POWER DOORS AND HATCHES.
"Long-Arm" System Co.....Cleveland.

PRESSURE REGULATORS.
Kieley & Mueller .....New York.
Ross Valve Co. .....Troy, N. Y.

PROPELLER WHEELS.
American Ship Building Co.....Cleveland.
Atlantic Works.....East Boston, Mass.
Bath Iron Works, Ltd.....Bath, Me.
Cramp, Wm. & Sons.....Philadelphia.
Crescent Ship Yard Co.....Elizabethport, N. J.
Detroit Ship Building Co.....Detroit.
Fore River Ship & Engine Co.....Quincy, Mass.
Great Lakes Engineering Works.....Detroit.
Hyde Windlass Co. .....Bath, Me.
Jenks Ship Building Co.....Port Huron, Mich.
Lockwood Mfg. Co.....East Boston, Mass.
Macbeth Iron Co.....Cleveland.
Maryland Steel Co.....Sparrow's Point, Md.
Milwaukee Dry Dock Co.....Milwaukee.
Moran Bros. Co.....Seattle, Wash.
Neafie & Levy Ship & Engine Building Co....Phila.
Newport News Ship Building Co Newport News, Va.
Phosphor Bronze Smelting Co., Ltd. ..Philadelphia.
Risdon Iron Works.....San Francisco.
Roelker, H. B. .....New York.
Sheriffs Mfg. Co. .....Milwaukee.
Superior Shipbuilding Co .....Superior, Wis.
Thropp & Sons Co., J. E. .....Trenton, N. J.
Trout, H. G. .....Buffalo.
United States Ship Building Co.....New York.

PROJECTORS, ELECTRIC.
Elwell-Parker Electric Co.....Cleveland.
General Electric Co.....Schenectady, N. Y.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

PUMPS FOR VARIOUS PURPOSES.
Blake, Geo. F., Mfg. Co.....New York.
Great Lakes Engineering Works.....Detroit.
Kingsford Foundry & Machine Wks. Oswego, N. Y.
"Long-Arm" System Co.....Cleveland.

PUNCHES, RIVETERS, SHEARS.
Allen, John F.....New York.
Chicago Pneumatic Tool Co. .....Chicago.

REFRIGERATING APPARATUS.
Roelker, H. B. .....New York.

REGISTER FOR CLASSIFICATION OF VESSELS.
Great Lakes Register .....Cleveland
Record of American & Foreign Shipping.New York.

RELEASING HOOKS FOR DETACHING BOATS.
Standard Automatic Releasing Hook Co. New York.

RIVETING MACHINES.
Allen, John F .....New York.
Chicago Pneumatic Tool Co. .....Chicago.

RIVETS, STEEL, FOR SHIPS AND BOILERS.
Bourne-Fuller Co. .....Cleveland.

RANGES.
Russell & Watson .....Buffalo.

RIVETS—BRASS AND COPPER.
Waterbury Brass Co. .....New York.

SAFETY VALVES.
American Steam Gauge Co. .....Boston.
Ashton Valve Co. .....Boston.
Crane Co .....Chicago.
Hayden Mfg. Co., N. L. .....Columbus, O.
Lunkenheimer Co.....Cincinnati.

SAIL MAKERS.
Baker, Howard H. & Co. .....Buffalo.
Upson-Walton Co. .....Cleveland.
Wilson & Silsby .....Boston.

SALVAGE COMPANIES.
See Wrecking Companies.

SCHOOLS, NAUTICAL.
Chicago Nautical School..... Chicago.
Seattle Nautical School .....Seattle, Wash.

SEARCH LIGHTS.
Elwell-Parker Electric Co.....Cleveland.
General Electric Co.....Schenectady, N. Y.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

SHEARS.
See Punches, Rivets, and Shears.

SHIP AND BOILER PLATES AND SHAPES.
Bourne-Fuller Co. .....Cleveland.

SHIP BUILDERS.
American Ship Building Co.....Cleveland.
Atlantic Works.....East Boston, Mass.
Bath Iron Works, Ltd.....Bath, Me.
Buffalo Dry Dock Co.....Buffalo.
Cramp, Wm. & Sons.....Philadelphia.
Craig Ship Building Co.....Toledo, O.
Chicago Ship Building Co.....Chicago.
Crescent Ship Yard Co.....Elizabethport, N. J.
Detroit Ship Building Co. .....Detroit.
Fore River Ship & Engine Co. .....Quincy, Mass.
Great Lakes Engineering Works.....Detroit.
Jenks Ship Building Co.....Port Huron, Mich.
Lockwood Mfg. Co.....East Boston, Mass.
Manitowoc Dry Dock Co. .....Manitowoc, Wis.
Marine Construction & Dry Dock Co.....
.....Mariner's Harbor, S. I., N. Y.
Maryland Steel Co.....Sparrow's Point, Md.
Milwaukee Dry Dock Co.....Milwaukee.
Moran Bros. Co.....Seattle, Wash.
Neafie & Levy Ship & Engine Building Co....Phila.
Newport News Ship Building Co Newport News, Va.
Risdon Iron Works.....San Francisco.
Roach's Ship Yard .....Chester, Pa.
Shipowners Dry Dock Co. .....Chicago.
Smith & Son, Abram .....Algonac, Mich.
United States Ship Building Co.....New York.
Warrington Iron Works.....Chicago.
Willard, Chas. P. & Co.....Chicago.

SHIP CHANDLERS.
Baker, Howard H. & Co. .....Buffalo.
Moran Bros. Co.....Seattle, Wash.
Reilly Repair & Supply Co., James....New York.
Upson-Walton Co. .....Cleveland.

SHIP LANTERNS AND LAMPS.
Helvig, H. A. J. .....New York.
Russell & Watson .....Buffalo.

SHIP TIMBER.
Martin-Barriss Co. .....Cleveland.
Moran Bros. Co.....Seattle, Wash.
Shurick, F. S. ..... New York.

SMOOTH-ON COMPOUND, FOR REPAIRS.
Smooth-On Mfg. Co. .....Jersey City, N. J.

SPARS—LARGE SIZES.
Moran Bros. Co.....Seattle, Wash.

STAYBOLTS, IRON OR STEEL, HOLLOW, OR, SOLID.
Falls Hollow Staybolt Co.....Cuyahoga Falls, O.

STEAM VESSELS FOR SALE.
Elwell, Jas. W. & Co. .....New York.
Holmes, Samuel .....New York.
King, Rufus S. .....New York.
McCarthy, T. R. .....Montreal, Can.
Newman, R. L. .....New York.
Weeks, F. H. .....New York.

STEAMSHIP LINES, PASS. AND FREIGHT.
American Line .....New York.
Cleveland & Buffalo Transit Co. .....Cleveland.
Erie & Western Trans. Co. .....Buffalo.
Goodrich Trans. Co. .....Chicago.
International Mercantile Marine Co .. Philadelphia.
Pere Marquette R. R. & S. S. Line.....Milwaukee.
Red Star Line .....New York.

STEEL CASTINGS.
Seaboard Steel Casting Co. .....Chester, Pa.
Macbeth Iron Co.....Cleveland.

STEERING APPARATUS.
American Ship Building Co.....Cleveland.
Chase Machine Co.....Cleveland.
Dake Engine Co. .....Grand Haven, Mich.
Detroit Ship Building Co.....Detroit.
Electro-Dynamic Co.....Philadelphia.
Hyde Windlass Co. .....Bath, Me.
Jenks Ship Building Co.....Port Huron, Mich.
Moulton Steering Engine Co..... New York.
Sheriffs Mfg. Co. .....Milwaukee.

STOCKS, BONDS, SECURITIES.
Fahey & Co. .....Cleveland.

SUBMARINE DIVING APPARATUS.
Morse & Son, A. J. .....Boston.
Schrader's Son, A. .....New York.

SURVEYORS, MARINE.
Gaskin, Edward .....Buffalo.
Matteson & Drake ..... Philadelphia.
Newman, R. L. .....New York.
Wood, W. J. .....Chicago.

TESTS OF MATERIALS.
Hunt, Robert W. & Co. .....Chicago.
Pittsburg Testing Laboratory Ltd. .....Pittsburg.

TILING, INTERLOCKING RUBBER.
New York Belting & Packing Co. .....New York.

TOOLS, METAL WORKING, FOR SHIP AND ENGINE WORKS.
Allen, John F. .....New York.
Chicago Pneumatic Tool Co.....Chicago.
Watson-Stillman Co. .....New York.

TOOLS, WOOD WORKING.
Atlantic Works, Inc. .....Philadelphia.

TOWING MACHINES.
American Ship Windlass Co.....Providence, R. I.
Chase Machine Co. .....Cleveland.

TOWING COMPANIES.
Donnelly Salvage & Wrecking Co....Kingston, Ont.
Midland Towing & Wrecking Co., Ltd.Midland, Ont.

TRAPS, STEAM.
Kieley & Mueller .....New York.
Lunkenheimer Co. .....Cincinnati.
Sturtevant Co., B F, Jamaica Plain. .....Boston.

TRUCKS.
Boston & Lockport Block Co. .....Boston.

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Shelby Steel Tube Co. .....Pittsburg, Pa.
Waterbury Brass Co.....New York.

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American Steam Gauge Co. .....Boston.
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Jenkins Bros. .....New York.
Kieley & Mueller .....New York.
Lunkenheimer Co. .....Cincinnati.
Ross Valve Co. .....Troy, N. Y.

VALVES FOR WATER AND GAS.
Ross Valve Co. .....Troy, N. Y.

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Berry Brothers, Ltd. .....Detroit.
Detroit Varnish Co..... Detroit.
Detroit White Lead Works..... Detroit.
New Jersey Zinc Co.....New York.
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Fleming & Co., P. H. .....Chicago.
Hall & Root .....Buffalo.
Helm & Co., D. T.....Duluth.
Hawgood & Co., W. A. .....Cleveland.
Holmes, Samuel .....New York.
Hutchinson & Co. .....Cleveland.
King, Rufus S. .....New York.
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Mitchell & Co. ..... Cleveland
Richardson, W. C. .....Cleveland.
Sullivan, D. & Co. .....Chicago.
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VENTILATING APPARATUS FOR SHIPS.
Sturtevant, B. F. Co. .....Boston.

WIRE—BRASS AND COPPER.
Waterbury Brass Co. .....New York.

WIRE ROPE AND WIRE ROPE FITTINGS.
Baker, H. H. & Co. .....Buffalo.
DeGrauw, Aymar & Co. .....New York.
Upson-Walton Co. .....Cleveland.

WHISTLES, STEAM.
American Steam Gauge Co. .....Boston.
Ashton Valve Co. .....Boston.
Lunkenheimer Co. ..... Cincinnati.

WHITE METAL—SHEETS, RODS AND WIRE.
Waterbury Brass Co. .....New York.

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American Ship Windlass Co.....Providence, R. I.
American Ship Building Co. .....Cleveland.
Hyde Windlass Co. .....Bath, Me.
Jenks Ship Building Co. .....Port Huron, Mich.

WINCHES.
American Ship Windlass Co.....Providence, R. I.
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Atlantic Works, Inc. .....Philadelphia.

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Midland Towing & Wrecking Co., Ltd..Midland, Ont.

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No. 20, Chi & Cleve Ex....	*7:20am	.....
No. 28, N Y & Bost Ex....	*7:40am	*8:00am
No. 40, Toledo & Buff Ac.	†10:00am	†10:40am
No. 32, Fast Mail	*11:25am	*11:30am
No. 44, Ac via Sandusky..	†1:40pm	..
No. 46, Southwestern Ex.	....	*3:00pm
No. 116, Conneaut Accom	.....	†4:30pm
No. 6, Lim Fast Mail....	*5:40pm	*5:45pm
No. 26, 20th Cent Lim....	*7:40pm	*7:43pm
No. 10, C., N Y & B Sp....	*7:30pm	*7:50pm
No. 16, New Eng Ex.....	*10:30pm	*10:35pm
No. 2, Day Express.	†9:10pm	†9.25pm
No. 126, Norwalk Accom.	†7:40am	.....

Westward.	Arrive from East.	Depart West.
No. 11, Southwestern Lim	*3:25am	.....
No. 7, Day Express.	.....	†6:00am
No. 15, Bost & Chi Sp....	*3:05am	*3:15am
No. 19, Lake Shore Lim..	*7:05am	*7:15am
No. 23, Western Express.	*10:30am	*10:35am
No. 29, Southwestern Sp.	†11:10am	.....
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No. 141, Sandusky Accom.	.....	†3:10pm
No. 43, Fast Mail	*4:35pm	*4:40pm
No. 127, Norwalk Accom..	.....	†5:10pm
No. 37, Pacific Express...	*7:00pm	*7:20pm
No. 3, Fast Mail Lim.....	*10:50pm	*10:55pm
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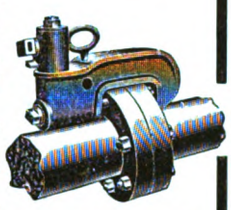

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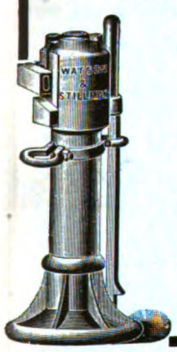

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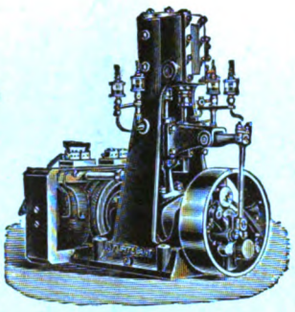

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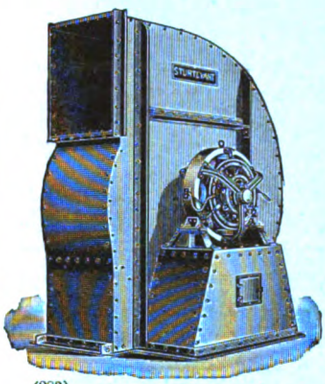

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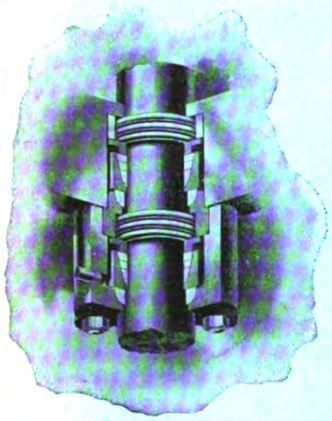

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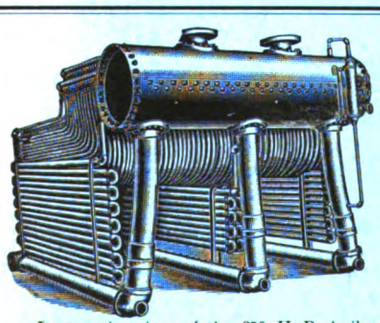

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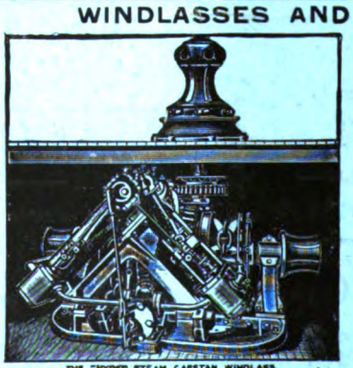

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